SMALL FARMING IN GRENADA:

AN INVESTIGATION OF ITS

NATURE AND STRUCTURE

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ABSTRACT

Throughout much of the developing world peasant agriculture represents a millstone around the neck of economic development. This study considers the problem as it is represented by small farming on the Caribbean island of Grenada and indicates some of the factors which contribute to this situation. Consideration is first given to the hypothesis that different levels of social-economic development affect the level of farming practice. To this end each of the island's six parishes was considered as a distinct statistical unit having its own level of development and farming practice. From preliminary analysis it was evident that the social-economic environment was not the most important influence on small farming and that the social background of the farmer had greater significance in this study. By classifying the farms as non-commercial, semi-commercial, commercial or miniature estates, and then by studying the nature and structure of these categories of farms, it was possible to observe the human and physical characteristics associated with the growth of small farms. The findings showed that most small farmers are old and poor, have a low social status and employ traditional methods of cultivation which are inefficient of space and time. Those who emerge as the more successful had obtained a certain level of education, had often worked overseas in order to save the capital necessary for purchasing land, and are the more highly motivated members of the small farming community, partly as a result of their religious beliefs and racial association. It is by identifying some of the social factors which restrict and retard the development of small farming in Grenada that this study makes its main contribution to the understanding of peasant agriculture.

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the family they not only made my stay a happy and memorable one, but gave me the opportunity to gain a deep understanding and appreciation of the West Indian way of life.

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All computer maps used Chloropleth Mapping System (C.M.S.) of T.C. Waugh, Department of Geography, University of Edinburgh, and run on I.B.M. computer at Edinburgh Regional Computing Centre.

LIST OF ABBREVIATIONS

G.E.S.	Grenada Electrical Services
F.A.O.	Food and Agricultural Organization of the United Nations
I.C.T.A.	Imperial College of Tropical Agriculture, now Faculty of Agriculture, St Augustine Campus, University of the West Indies
I.S.E.R.	Institute of Social and Economic Research, U.W.I.
P.H.O./W.H.O.	Public Health Organization of the World Health Organization
U.C.W.I.	University College of the West Indies
U.N.E.S.C.O.	United Nations Educational and Scientific Organization
U.N.	United Nations
U.W.I.	University of the West Indies
$	refers to Eastern Caribbean currency dollar, where one pound sterling = $4.80

INTRODUCTION

The problem

Agriculture is the principal source of income and employment in the West Indies, and will remain so within the foreseeable future. The outstanding problem in this region is the pressure of population on the land. As land is usually the only major natural resource (bauxite deposits in Jamaica and Guyana are notable exceptions) it is 'imperative to devise a system, or systems, of agricultural production and distribution aiming at the highest possible returns per acre of land while maintaining the land itself in good physical condition and fertility'.[1] Where population densities are high (Table I) there is a great need for effective land-use planning, efficient organization in marketing, and for the farmer to improve his methods of cultivation and to adopt a more scientific approach to farming.

The problem posed by West Indian agriculture has long been recognized. Various reports and inquiries have been made on the subject and development schemes undertaken for its improvement, yet many of the observations and criticisms made in the West Indies Royal Commission Report on 1897 and in subsequent reports[2] are still valid today;

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1. S.D. Neumark, 'The Importance of Agriculture in Caribbean Economy', Caribbean Economic Review, Vol. 3, nos. 1 and 2, October 1951, p.1.

2. Report of the West India Royal Commission, 1897, H.M.S.O.
Report of the West India Sugar Commission, 1930, H.M.S.O.
Report of the West India Royal Commission, 1938/39, H.M.S.O.

TABLE I POPULATION DENSITY IN THE BRITISH WEST INDIES

	Area in sq.miles	Population* in thousands	Population per sq.mile
Jamaica	4,411	1,959	444
Trinidad	1,980	1,040	525
Barbados	166	254	1,530
Leeward Islands			
St Kitts, Nevis and Anguilla	150	56	373
Antigua	170	63	371
Montserrat	34	15	441
Windward Islands			
Dominica	305	74	243
St Vincent	150	95	633
St Lucia	233	110	472
Grenada (including Carriacou)	133	105	789

Source: U.N. Demographic Year Book 1970

* Estimates of population for 1969

the small farmer, or peasant cultivator,[3] has continually been noted for his inefficient and primitive system of farming, which has principally been concerned with subsistence cultivation of food crops and possibly the production of one or two cash crops. In general these reports noted the major handicaps confronting the peasant farmer. These were again identified and summarised by Jolly (1956) as being:-

3. For the growth of the West Indian peasantry see W.K. Marshall, 'Notes on Peasant Development in the West Indies since 1938', Social and Economic Studies, Vol. 13, no. 3, September 1968, pp.252-263.

1) The poor quality of the small farmer's land, which is often the least accessible because

> West Indian agriculture developed under estate organization, the only land that became available to the small farmer was that which no planter thought good enough to form into an estate, or land on which estate agriculture did not survive.[4]

Consequently, the land is infertile, swampy, rocky and has a high degree of slope.

2) The fragmentation of the farmer's property, caused by the piece-meal acquisition of new land. This restricts the type of tools and equipment which can be used, and is an inefficient and time-consuming arrangement that limits agricultural development.

3) The system of marketing for local food crops, which is 'most inefficient and disorganized'.[5] The cost of marketing, the lack of a guaranteed price and uncertainty of sale have discouraged the small farmer from specializing in food crops.

4) The established emphasis upon export crops as a source of cash worsens the seasonal distribution of labour. This situation contributes to part-time unemployment and underemployment, and creates a need for hired labour during the busy seasons.

5) The lack of capital is a great handicap, although it is not solely the 'absolute lack of capital, but rather the unwillingness of farmers to make agricultural investments'.[6] Thus, a vicious circle exists whereby the poverty of the peasant farmer encourages inefficiency (such as not

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4. A.L. Jolly, Readings in Small Scale Farming, Memoirs of the Imperial College of Tropical Agriculture, Trinidad, 1956, p.1.

5. Ibid., p.2.

6. Loc. cit.

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4. A.L. Jolly, Readings in Small Scale Farming, Memoirs of the Imperial College of Tropical Agriculture, Trinidad, 1956, p.1.

5. Ibid., p.2.

6. Loc. cit.

investing in fertilizer) and hence results in greater poverty.[7]

With this daunting analysis, the various reports advocated increased settlement of estate labourers on land as peasant proprietors, the cultivation of more and better crops, the raising of more and better animals, the improvement of various branches of agricultural administration, especially marketing and extension services, and the incorporation of rural science into the primary school curriculum. It was hoped that, through mixed farming, greater economic self-sufficiency would be achieved by many islands.[8] When implementing these recommendations in schemes for specific islands, 'government technicians, university economists and agricultural spokesmen stressed the technical and economic aspects of agricultural development to the virtual exclusion of others'.[9] Social goals, it was assumed, were to be direct or indirect consequences of such planning. Bitter experience showed this to be an erroneous assumption, as the failure to meet certain social demands precipitated additional failures in the development schemes, so that generally there was little improvement in small farming.

Surveys and development plans for the West Indies during the past decade have reiterated the nature of the problem. Dumont (1963), O'Loughlin (1963), the Tripartite Survey (1966) and the United Nations

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7. A.L. Jolly, Report on Peasant Experimental Farms at the Imperial College of Tropical Agriculture, Trinidad Commission, Trinidad, 1954, p.3.

8. S.D. Neumark, op. cit., p.40.

9. G.E. Cumper, 'Non-Economic Factors Influencing Rural Development Planning', Social and Economic Studies, Vol. 17, No. 3, 1968, p.243.

Economic Survey (1967)[10] all recognized the fact that the expansion of agricultural production depends as much on the small farmer's capacity for change and his acceptance of new ideas as it does on the use of new methods. The lack of any real achievement from previous development plans is evident in the recent description of the small farming in the Tripartite Reports, which also sheds some light on the levels of farming practices.

> The small scale peasant production of food crops and livestock is generally considered to be extremely inefficient. Yields of individual crops are low, the productivity of labour (using hand tools) is extremely low, cultural techniques are traditional so that modern techniques of weed, pest and disease control (and even chemical fertilizers) are hardly employed. Since the farmers have received only a limited general education and no formal training in the principles and practice of improved farming, the inadequacies of their practice tend to be regarded as inevitable ....[11]

The increased appreciation of the fact that social factors present in the farming community hinder agricultural development is due in part to the activities of sociologists and anthropologists in the West Indies, especially since the 1940s. Their studies have led to a greater understanding of the rural population: their way of life, their value judgments, their beliefs and their economic organization. Of particular interest is the work of M.J. and F.S. Herskovits (1947), Kerr (1951), R.T. Smith

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10. R. Dumont, Planning Agricultural Development, FAO Report to Government of Jamaica, Rome, 1963.

    C. O'Loughlin, A Survey of Economic Potential and Capital Needs of the Leeward Islands, Windward Islands and Barbados, H.M.S.O., 1963.

    United Nations, Economic Survey of Latin America 1967, New York, 1969.

    J.R. Sargent et al., Report of the Tripartite Economic Survey of the Eastern Caribbean, H.M.S.O., 1967.

11. J.R. Sargent, op. cit., p.35.

(1956), Clarke (1957), Klass (1961) and M.G. Smith (1962).[12]

M.G. Smith and Kruijer (1957) in the sociological manual for extension workers, mention that:-

> The traditional character of Jamaican small farming ... acts as a barrier in the way of progress. Many farmers still have a 'tenant mentality' towards farming. Tenants without security of tenancy (and also small landowners with a tenant mentality) are disinclined to invest money in their farms, and are very keen to get a quick return for the money and labour put into their farms .... The economic goal of backward impoverished tenant farmers who have no security of holding is to reap a quick crop without much effort and investment, and without bestowing much care on the land.[13]

This illustrates that the 'analysis of economic and technological factors alone is insufficient to develop scientific formulations'[14] which reach to the heart of the problem. Thus, there is a need for an inter-disciplinary approach which 'would throw into relief the increasingly important problem of how to formulate rational policy problems'.[15]

O'Loughlin (1963) stated that 'research in peasant management and

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12. M.J. and F.A. Herskovits, Trinidad Village, New York, 1947.
M. Kerr, Personality and Conflict in Jamaica, Liverpool, 1951.
R.T. Smith, The Negro Family in British Guiana: Family Structure and Social Status in the Villages, London, 1956.
E. Clarke, My Mother who Fathered Me: a study of the family in three selected communities in Jamaica, London, 1957.
M. Klass, East Indians in Trinidad, New York, 1961.
M.G. Smith, West Indian Family Structure, Seattle, 1962.
A comprehensive review of the literature is contained in M.G. Smith's introduction to the second edition (1966) of Clarke's book.

13. M.G. Smith and G.J. Kruijer, A Sociological Manual for Extension Workers in the Caribbean, University College of the West Indies, 1957, pp.16-27.

14. M.J. Herskovits, 'Motivation and culture-pattern in technological change', Social Change and Economic Development, ed. J.Meynaud, U.N.E.S.C.O., Paris, 1963, p.41.

15. G.E. Cumper, o. cit., p.249.

economic and social structure will be extremely valuable if it can shed light on factors which are holding back production increases.'[16] It is an aim of this thesis to investigate the nature of these factors and, if only with a pencil of light, to identify some of them.

The case for a geographic study

A geographic study of this problem is justified on two counts:-

1) Since geographers are primarily concerned with man's impact on the earth's surface and as agriculture is man's most common means of obtaining a livelihood, it follows that such a study is geographical.[17]

2) As a discipline, geography has been regarded as bridging the gap between the arts and science, and more recently as a subject which can integrate aspects of the social sciences.[18] Geography has an inter-disciplinary character and can explore the realm of factors influencing small farming.

According to Coppock (1969), geographers should contribute to economic development by employing their skills to describe and evaluate present use of agricultural resources and in so doing assist in planning for their more effective exploitation.[19] Geographers,

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16. O'Loughlin, op. cit., p.3.

17. J.T. Coppock, 'Agricultural geography in tropical Africa' in Environment and Land in Africa, ed. M.F. Thomas and G.W. Whittington, London, 1969, p.9.
J.T. Coppock, 'The Geography of Agriculture', Journal of Agricultural Economics, Vol. 19, No. 2, 1968, p.154.

18. N.S. Ginsberg, 'On Geography and Economic Development', in Problems and Trends in American Geography, ed. S.B. Cohen, New York, 1967, p.199.

19. J.T. Coppock, 'Agricultural geography in tropical Africa', op. cit., p.10.

however, have not presented many substantive works on tropical agriculture, and their contribution to peasant development programs has consequently been meagre.[20] Floyd (1969) sees the topics as an area of challenge for agricultural geographers, where first they have 'an obligation to pursue detailed micro-studies of habitats and land use systems', and second 'to capture their elements and functioning through modern analytical methods such as factor analysis'.[21]

Grenada as an appropriate island for study

It was in this context that a study was undertaken to investigate the nature and structure of small farming in the Windward Island of Grenada. This island is particularly suitable because:-

1) The agricultural problems are fully representative of those in the West Indies. Grenada has an agricultural base to its economy (over 80 per cent of its visible export earnings are obtained from agricultural products), a relatively high rate of population growth (over 2.5 per cent per annum during the past five years since the stream of outward migration to the United Kingdom was reduced to a mere trickle) and a high level of population pressure of an estimated 815 persons per square mile in 1969, or a real population density of 1,386 persons per square mile of cropland.

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20. J. Blaut, 'Geography and the Development of Peasant Agriculture', in Cohen, op.cit., pp.199-200.

21. B. Floyd, 'Towards a More Specific Geography of Traditional Agriculture in the Tropics: or Good-bye to Machete and Dibble Stick', The Professional Geographer, Vol.21, No.4, 1969, p.250.

2) The island's area of 120 square miles, or 76,800 acres, was considered a manageable area for a comprehensive study. Therefore the island is an example of what Coppock (1969) would consider as an approximation of laboratory conditions for a social scientist, where a large number of small farmers operate in 'an environment with few external links and a relatively simple economic climate'[22] and hence is suitable for this type of study.

3) In physical character Grenada is similar to other volcanic islands in the West Indies, namely St Lucia, St Vincent and Dominica, which have similar problems of economic development but where the pressure of population is less. Thus a study of small farming in Grenada may also lead to a greater understanding of the factors affecting agriculture elsewhere in the West Indies.

4) Previous research on the island had illustrated the need for such a study and contacts with governmental officials indicated that it would be welcomed.[23] This conferred personal advantages which were not assured on other West Indian islands.

5) Compared with some parts of the Caribbean, Grenada has not been subjected to much research. The major piece of scholarship directly concerned with Grenada is M.G. Smith's Stratification in Grenada (1965), a sociological study of the behaviour and attitudes of the island's upper class of society.[24] Other notable works include a

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22. J.T. Coppock, 'Agricultural geography in tropical Africa', op. cit., p.10.

23. J.S. Brierley, 'Domestic Food Crop Production and Marketing, Grenada, West Indies', unpublished M.A. thesis, University of Alberta, Edmonton, 1968.

24. M.G. Smith, Stratification in Grenada, Los Angeles, 1965.

history of the island by Devas (1965), a brief monograph on the commercial geography by Kingsbury (1960), a general background survey of the island edited by Knight (1946)[25] and various development surveys which have been undertaken by the United Nations, the British government and the Institute of Social and Economic Research, Barbados, and which will be referred to during the course of this thesis. Recent theses by two geographers, Morissett (1968) and Momsen (1969),[26] included Grenada as one of several islands in the Caribbean, and there is thus scope for a detailed geographic study of small farming.

Aims and methodology

By studying the nature and structure of small farming in Grenada, the aim is to identify factors which influence the development of agriculture. Both external forces, such as the social and economic environment in which the small farming system functions, and the internal influence in the personal character and background of the farmer, are considered. The six parishes on the island were taken to represent six statistical units at different levels of social and economic development. It was thought that if the sample of small farmers were representative

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25. R.P. Devas, The History of the Island of Grenada, Extra Mural Department, University of the West Indies, 1965.
R.C. Kingsbury, Commercial Geography of Grenada, Indiana University, Office of Naval Research Technical Report No. 3, Bloomington, 1960.
E. Knight, ed., The Grenada Handbook and Directory, Bridgetown, Barbados, 1946.

26. J. Morissett, 'Microcosmes a la Derive de l'histoire', unpublished M.A. thesis, Laval University, 1968.
J.D. Momsen, 'The Geography of Land Use and Population in the Caribbean (with special reference to Barbados and the Windward Islands)', unpublished Ph.D. thesis, University of London, 1969.

of the total parish population it might be shown that this level influenced the general level of small farming in the parish.

Field research, which was undertaken in the first six months of 1969, involved the collection of all available data that would indicate levels of development in the social-economic landscape of the parishes, and a sample survey by questionnaire of small farmers that would provide information on their background and on the structure and nature of their agriculture. A major drawback in planning the structure of the sample in late 1968 was that the last available agricultural census of the island had been made in 1946.[27] This listed the number of holdings by size category and indicated that out of a total of 9,996 holdings, 4,653 were less than 1 acre in size, 1,809 were of 1-2 acres, 2,287 were of 2-5 acres, 931 of 5-15 acres, and 378 over 15 acres. This census classified holdings under 1 acre as small plots as distinct from farms. This distinction was used in this study, so that small farmers are defined as those with 1 acre or more of land, but with no more than 15 acres. This classification accounts for 5,027, or 50 per cent of the landholders, and a 6 per cent sampling proportion gave a sample size of about 300. After completing the research, access was gained to the 1961 West Indies Agricultural Census.[28] This shows that the number of holdings had increased to 13,330, of which 6,222 were under 1 acre, 6,606 of 1-15 acres, and 502 over 15 acres, so that small farmers covered by the survey still represent 50 per cent of all land-holders and occupy

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27. West Indies Census, 1946: Part B, Census of Agriculture, Kingston, 1950.

28. West Indies Census of Agriculture, 1961: The Eastern Caribbean Territories, Bridgetown, Barbados, 1968

approximately 18,700 acres, or 32 per cent of the 58,026 acres of cultivated land on the island. If it is assumed that the family size of 5.66 persons per household as found in the survey existed in 1961 when the census was taken, then the sample of small farmers is representative of approximately 46 per cent of the island's population.

Field work was aided by the co-operation of the Grenadian Department of Agriculture which afforded every assistance in arranging transportation and providing access to agricultural records and documents. Additional assistance and information were obtained from the United Nations Physical Planning Commission and British Development Division in Barbados, the office of the Canadian High Commissioner in Port-of-Spain, and from staff members at the University of the West Indies at St Augustine, Trinidad and Cave Hill, Barbados.

Data obtained from the questionnaire were transferred to 80 column punch cards, which made analysis possible by card sorters, interpreting machines, and computer programs, notably the 'Statistical Package for the Social Sciences'.[29]

Preliminary results showed that in order to make a meaningful study of small farming it was expedient to divide the farmers into non-commercial, semi-commercial, commercial or operators of miniature estates. These categories of farmers are examined in detail with respect to the nature of their agriculture and their social and economic background, with reference made where appropriate to differences between the parishes. Levels of farm practice were determined for each farm in

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29. N.H. Nie, D.H. Best and C.H. Hull, Statistical Package for the Social Sciences, New York, 1970.

the various categories for comparison with the levels of social and economic development in the parishes. Finally, factor analysis identified factors influencing small farming and these add support to some of the findings from the analysis of the nature and structure of small farming.

Organisation of the thesis

The first part of this thesis presents the cultural and physical background of Grenada so that the small farmer can be seen in context. This background includes a brief historical review, an examination of the economic structure, a description of the physical environment and an analysis of the social-economic landscape of the parishes. An explanation of the design of the questionnaire and of the sampling methods employed in the investigation of small farmers is then given. The next chapters give a social description of the small farmers based on analysis of questionnaire and general observations. Results from this analysis establish a set of norms for small farmers as a whole, against which subsequent analysis of the four categories of small farmers can be compared and contrasted. For the purpose of introducing agriculture, and to establish a further set of norms, the system of tenure and the degree of fragmentation of holdings are described and analysed. The study of the four categories of small farmers, from non-commercial to miniature estate, is then made against this backdrop. Factors influencing agriculture are identified, and the thesis concludes with a brief account of how the findings might benefit the development of small farming in Grenada.

CHAPTER 1

GRENADA, ITS HISTORY AND ECONOMY

Introduction

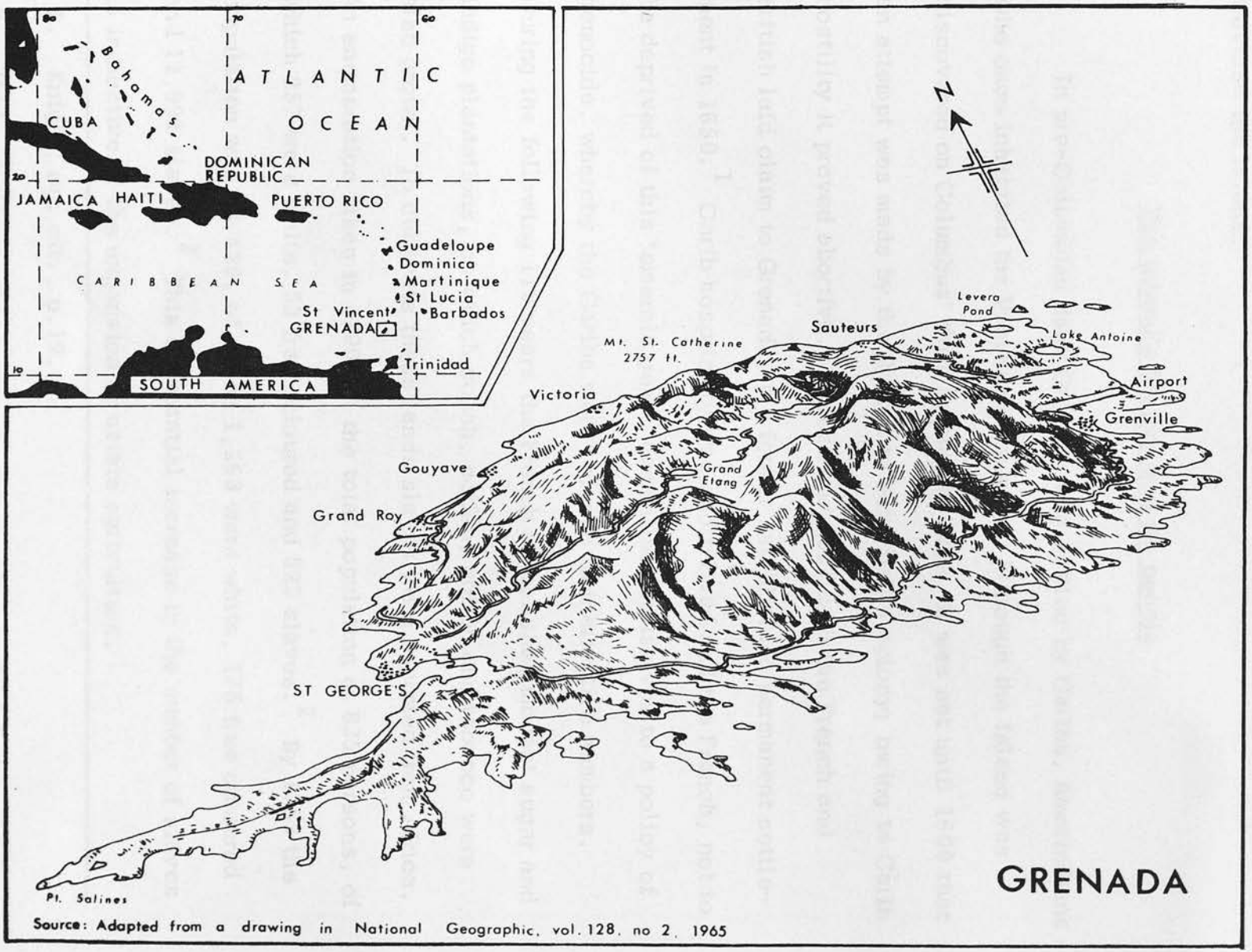
Grenada is the most southerly of the Windward Islands and is located 68 miles south-west of St Vincent and 90 miles north of Trinidad and the South American mainland. It is situated between the parallels $11^{o}59'$ and $12^{o}15'$ north latitude, and between meridians $61^{o}35'$ and $61^{o}48'$ west longitude. The island is 21 miles in length and 12 miles at its greatest width, and has an area of 120 square miles, most of which has rugged and mountainous features with some flat land found mainly along the east and south coasts (Fig. 1).

The island is divided into the following parishes with their respective towns:-

Parish	sq.miles	Town
St George's	26.16	St George's
St John's	14.99	Gouyave
St Mark's	9.07	Victoria
St Patrick's	16.43	Sauteurs
St Andrew's	34.69	Grenville
St David's	18.43	--
Total	119.77	

Source: The Grenada Handbook and Directory 1946

St David's does not have a parish town, although there is a village of the same name. St George's Town is the seat of government, principal port and business centre and its estimated population of 8,000 in 1968



Source: Adapted from a drawing in National Geographic, vol. 128, no 2, 1965

is more than three times that of the second order towns, Grenville and Gouyave (Fig. 2). Much of the remaining population is concentrated in villages and in ribbon settlements along roads which circumscribe and traverse the island.

The island's history and its people

In pre-Columbian days Grenada was settled by Caribs, Amerindians who once inhabited the Venezuelan jungle. Although the island was discovered on Columbus' third voyage in 1498, it was not until 1609 that an attempt was made by the British to establish a colony; owing to Carib hostility it proved abortive. In 1626 and 1627 both the French and British laid claim to Grenada, the former establishing permanent settlement in 1650.[1] Carib hospitality was short-lived and the French, not to be deprived of this 'emerald gem', committed themselves to a policy of genocide, whereby the Caribs were reduced to ineffective numbers. During the following 110 years the French established modest sugar and indigo plantations, on which cocoa, coffee, cotton and tobacco were also grown. To cultivate these lands slaves were imported from Africa. An enumeration taken in 1700 put the total population at 835 persons, of which 257 were white, 53 free coloured and 525 slaves.[2] By 1753 the population was 13,429, of which 1,263 were white, 175 free coloured and 11,991 slaves.[3] This substantial increase in the number of slaves is indicative of the expansion of estate agriculture.

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1. Knight, op. cit., p.19.
2. Ibid., p.22.
3. Loc. cit.

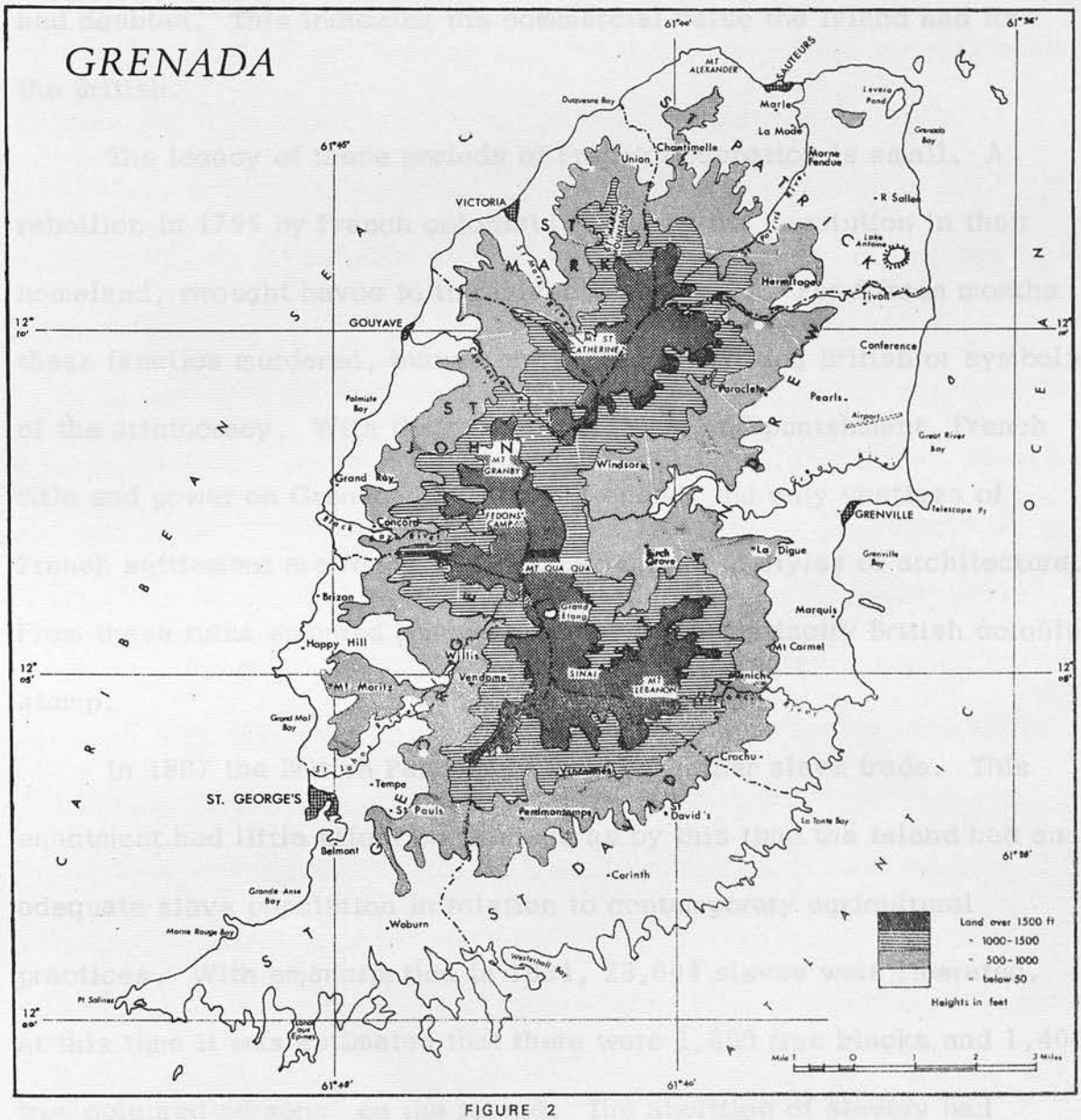
GRENADA
CARIBBEAN SEA
ATLANTIC OCEAN
ST. GEORGE'S
GOUYAVE
VICTORIA
GRENVILLE
ST. MARK
ST. JOHN
ST. DAVID
MT ALEXANDER
SAUTEURS
Duquesne Bay
Marie
La Mode
Chantimelle
Union
Marne Fendue
Levera Pond
Grenada Bay
R Salle
Lake Antoine
Hermitage
Tivoli
Conference
Paraclete
Pearls
Airport
Great River Bay
Telescope Pt
Grenville Bay
Palmiste Bay
Grand Roy
Concord
Windsor
Mt Granby
Fedons Camp
Mt Qua Qua
Birch Grove
La Digue
Brizan
Happy Hill
Willis
Vendome
Mt Moritz
Grand Mal Bay
Grand Etang
Sinai
Mt Lebanon
Marquis
Mt Carmel
Venich
Crochu
Tempe
St Pauls
Vincennes
Pentmonsoupe
David's
La Tonte Bay
Belmont
Corinth
Grande Anse Bay
Marne Rouge Bay
Woburn
Westerhall Bay
Pt Salines
Land Out Spines
Land over 1500 ft
1000-1500
500-1000
below 50
Heights in feet
Mile 1
0
1
2
3 Miles
61°45'
61°40'
61°36'
12° 10'
12° 05'
12° 00'
61°48'
61°40'

FIGURE 2

In 1762 the island fell to the British and though there was a brief return to French rule in 1779 it again became British in 1783 by the Treaty of Versailles. The British more readily appreciated the island's agricultural potential and soon exploited it. By 1771 the slave population had reached 26,211, with whites numbering 1,661, and the free coloureds 415.[4] Thus, in less than twenty years the number of slaves had doubled. This indicates the commercial value the island had for the British.

The legacy of these periods of French occupation is small. A rebellion in 1795 by French colonists, fired by the Revolution in their homeland, wrought havoc to the island's economy.[5] For fifteen months these fanatics murdered, burned and looted everything British or symbolic of the aristocracy. With their eventual defeat and punishment, French title and power on Grenada were finally ended; the only vestiges of French settlement are found in place names and in styles of architecture. From these ruins emerged a new Grenada with a distinctly British colonial stamp.

In 1807 the British Parliament forbade further slave trade. This enactment had little effect on Grenada as by this time the island had an adequate slave population in relation to contemporary agricultural practices. With emancipation in 1834, 23,604 slaves were liberated. At this time it was estimated that there were 1,600 free blacks and 1,400 free coloured persons[6] on the island. The abolition of slavery had

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4. Ibid., p.25.

5. Devas, op. cit., p.118.

6. Knight, op. cit., p.40.

far-reaching effects in transforming the economic base and social character of Grenada. The effect of freedom on the negro seems to have filled him,

> ... with distaste for regular labour on the sugar estates for fixed wages. The quantity of uncultivated land in the interior of the island, and the ease with which it could be bought, rented, or from his point of view, better still, squatted upon, caused the establishment almost immediately of numerous 'gardens' therein. [7]

As a means of attracting labourers, estates introduced the metayer system to transform their sugar lands into orchards of cocoa and nutmegs, a less labour-intensive operation.[8] As a result Grenada had the most substantial body of peasant proprietors of any island in the Leeward and Windward group.[9]

Estate workers were also obtained by importing indentured labourers from Malta (1839) and Madiera (1846-47). This was of marginal success as many Madierans became shopkeepers. In 1849 and 1850 liberated slaves from African colonies came to the island under an indentureship scheme. Of much greater significance to the agricultural community, however, was the arrival of 2,022 East Indian labourers between 1857 and 1862. They gave a fillip to estate production and, through their disciplined working habits and application to the land, have made a valuable contribution to the island.

These human migrations completed the racial and cultural elements from which Grenada's present population developed during a century of

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7. Ibid., p.41.

8. C.Y. Shephard, 'Peasant Agriculture in the Leeward and Windward Islands', Tropical Agriculture, Vol.24, April-June 1947, p.69.

9. A more detailed account of the development of Grenadian peasantry is in the writer's unpublished M.A. thesis, op.cit.

miscegenation and cultural interaction. The small farmers represent a cross-section of this population and exhibit different attitudes to their land depending upon their racial and cultural background.

Political structure

Grenada was included in the Government of the Windward Islands in 1833. By 1877 it had become a Crown Colony and had its own Legislative Council. In 1959 new provision was made for the Government of Grenada, whereby the post of Governor of the Windward Islands was abolished and Grenada became a separate territory with its own administration. A further constitutional advance was made in 1967 when Grenada became an Independent State in association with Great Britain. This constitution gave full internal self-government with the right to opt for independence or unitary statehood with any other territory at any time. Britain, however, remains responsible for foreign affairs and defence.

Grenada was a member of the Federation of the West Indies, which was established on 31st July 1957 and dissolved on 29th May 1962. This membership did not affect the constitution.[10]

Economic structure

Of all facets of Grenada's character the most disquieting is its economy. A deficit trade gap has widened to the point where it is currently twice the value of visible export earnings (Fig. 3). Drastic changes are necessary if the island is to have a viable economy. Only rigorous measures can curb inflation, decrease population growth,

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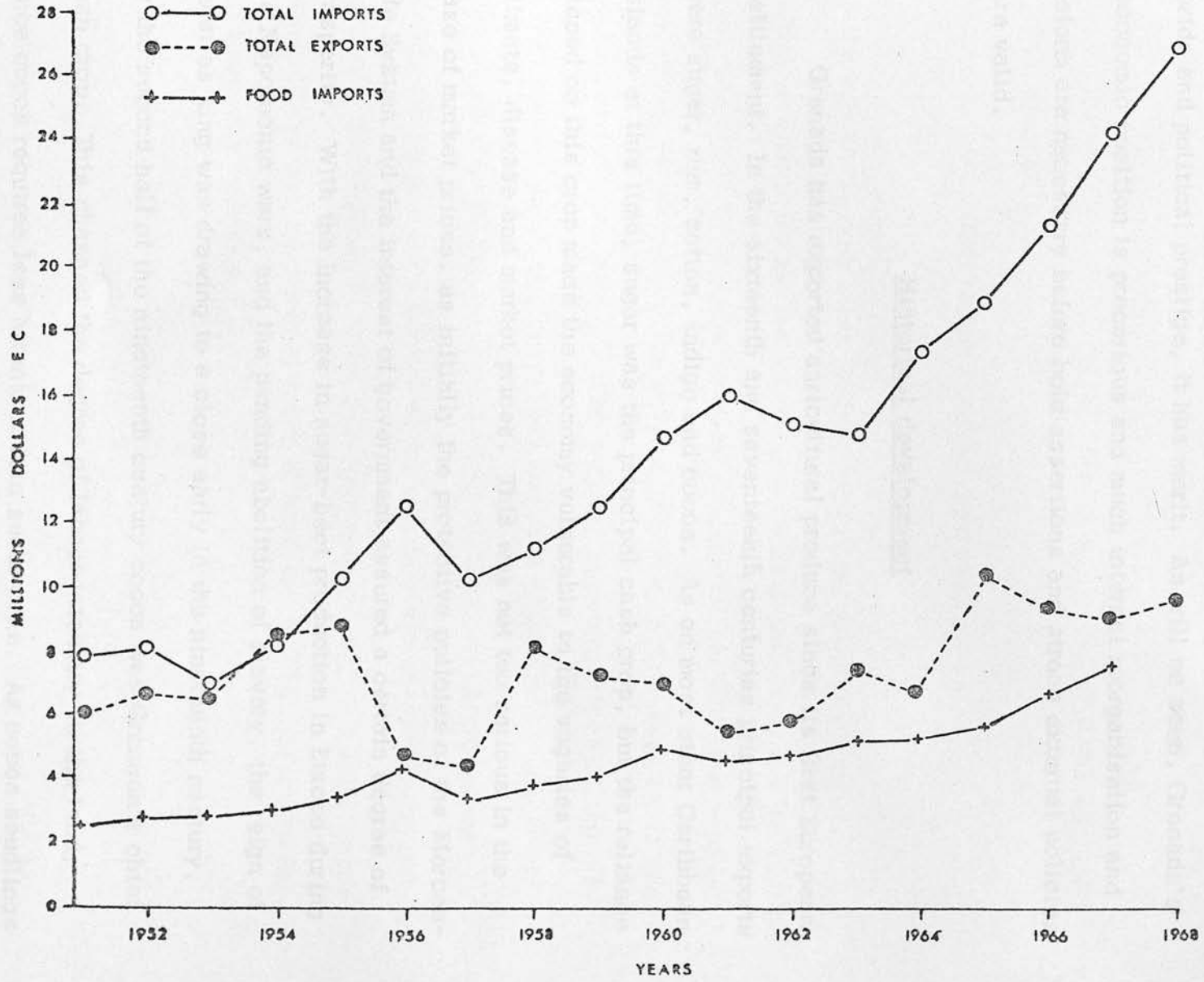
10. HMSO, Grenada, Report for the years 1965 and 1966, London, 1968, p.46.

GRENADA - VALUE OF IMPORTS AND EXPORTS



implement import substitution, woo tourists, attract industry, and secure world markets and prices for export crops. Grenadian politicians are confident of their future, and declared in their 1970 budget that they would no longer accept British grants-in-aid. This show of economic self-assurance is unjustified, although, in the interests of national pride and political prestige, it has merit. As will be seen, Grenada's economic position is precarious and much internal reorganisation and reform are necessary before bold assertions and strong external policies are valid.

Historical development

Grenada has exported agricultural produce since its first European settlement. In the sixteenth and seventeenth centuries principal exports were sugar, rum, cotton, indigo and cocoa. As on most other Caribbean islands at this time, sugar was the principal cash crop, but the reliance placed on this crop made the economy vulnerable to the vagaries of climate, disease and market prices. This was not too serious in the case of market prices, as initially the protective policies of the Mercantile System and the interest of government assured a certain degree of prosperity. With the increase in sugar-beet production in Europe during the Napoleonic wars, and the pending abolition of slavery, the reign of sugar as king was drawing to a close early in the nineteenth century. By the second half of the nineteenth century cocoa was Grenada's chief cash crop. This changed the degree of labour intensity on the land, since cocoa requires less attention than sugar cane. As cocoa seedlings require several years to produce and do not reach maximum production

until they are seven or eight years old, the economy becomes more vulnerable to disease and storm damage. Table 1.1 shows the extent of this economic change.

TABLE 1.1 GRENADA, CHANGE IN ECONOMIC PRODUCTION 1846-86

	Exports by weight (pounds)	
	1846	1886
Sugar	9,196,588	2,038,712
Cocoa	374,686	5,864,090
Spices	-	100,000

Source: Grenada Handbook and Directory 1946, p.51.

By the end of the nineteenth century food crops were produced in sufficient quantities for the transaction of inter-island trade. In 1909 sugar was not even included in a list of exports. At that time, cocoa represented 88 per cent of the value of exports, with nutmegs and mace accounting for 6 per cent.[11] With a slump in cocoa prices during the 1920s, nutmeg production increased and thus broadened the economic base of the island. However, if natural disaster should strike the island, the recuperative powers of the economy are weakened, as nutmeg trees take 20-25 years to reach peak production. By 1939 cocoa represented 47 per cent of the total value of exports, followed by nutmegs and mace at 42 per cent.[12]

Economic development since 1945

The post-war period has witnessed the rise of bananas as a major export crop. Under normal circumstances the local farmer was reluctant

11. Knight, op. cit., p.76.

12. Grenada, Annual Overseas Trade Report 1961, St George's, pp.1-6.

to change the nature of his farming enterprises to include bananas. There was little incentive to change provided cocoa and nutmeg prices remained high; in any case he lacked the necessary knowledge and skill for banana cultivation.[13] Hurricane Janet in 1955 swept in a period of change: the rapid development of the island's banana industry. With 80 per cent of cocoa and nutmeg trees destroyed or severely damaged, there was an immediate need to re-vamp the economy with short-term crops. Bananas were attractive, for not only were they profitable and gave a return one year after planting, but they could also serve as a shade crop for cocoa if the subsequent intention was to re-establish this crop. The result was not without benefit to cocoa producers, who were able to replant their lands with an improved strain of high-yielding cocoa, the clonal type. Thus, while the economy suffered a severe setback as a result of Hurricane Janet, it became subsequently rejuvenated and more diversified. The rise in banana production and its contribution to Grenada's economy is seen in Table 1.2.

Over the past decade bananas, cocoa and nutmegs accounted on average for over 95 per cent of the value of domestic exports. In the near future, other agricultural crops are unlikely to rival this triumvirate.

An examination of the value of domestic export indicates that economic growth is uncertain, inadequate and erratic (Tables 1.2 and 1.3). These characteristics reflect fluctuating market prices for cocoa and nutmegs, as well as levels of production, since bananas have a guaranteed price per pound on the British market. Figure 4 shows the recent trends in the production and value of the major export crops.

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13. B. Persaud, Grenada Agricultural Problems and Proposals for Development 1969-1973, Barbados, 1968, p.3.

TABLE 1.2 GRENADA: VALUE OF DOMESTIC EXPORTS AND IMPORTANCE OF MAIN COMMODITIES for 1954, 1962, 1966 and 1967

	Exports							
	1954 $1,000 E.C.	Percent of total	1962 $1,000 E.C.	Percent of total	1966 $1,000 E.C.	Percent of total	1967 $1,000 E.C.	Percent of total
Cocoa	4959	58.5	2700	44.5	2313	23.1	3040	35.8
Nutmegs and mace	2917	34.4	1814	29.9	4803	48.0	1615	19.4
Bananas	189	2.2	1217	20.1	2579	25.8	3535	41.5
Other exports	414	4.9	357	5.5	309	3.1	360	4.3
Total domestic	8479	100.0	6068	100.0	10003	100.0	8580	100.0

Source: Grenada, Annual Overseas Trade Reports, 1959-68

TABLE 1.3 GROWTH RATES OF EXPORTS, IMPORTS AND TRADE BALANCE

	Annual average value million $ E.C.				Average annual growth rates		
	1955-56	1960-61	1965-66	1967-68	1955-61	1960-66	1966-68
Exports	6.81	6.43	10.03	9.22	-1.12	+14.20	-1.58
Imports	11.44	15.43	20.40	25.25	+6.97	+6.70	+4.75
Trade balance	-4.63	-8.91	-9.87	-15.91	18.05	2.02	12.02

Source: Grenada, Annual Overseas Trade Reports, 1959-68

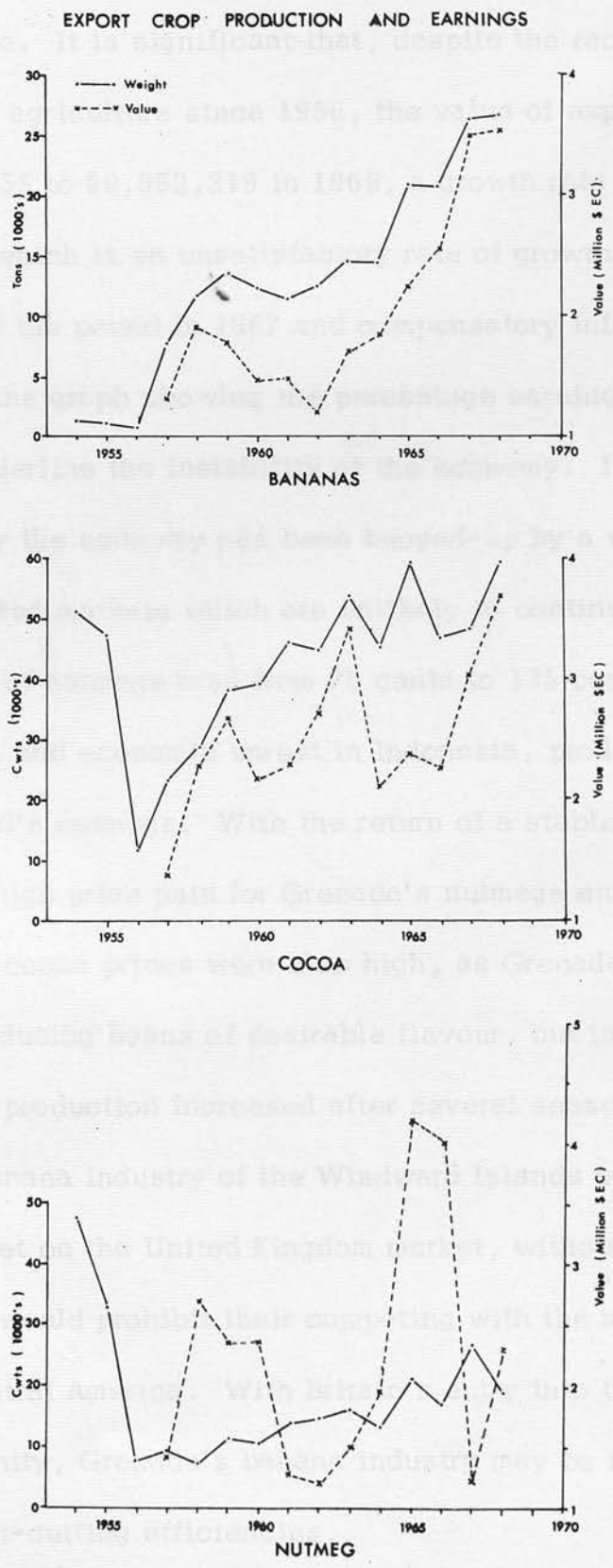
EXPORT CROP PRODUCTION AND EARNINGS
Weight
Value
Tons (1000's)
Value (Million $ EC)
BANANAS
Cwts (1000's)
Value (Million $EC)
COCOA
Cwts (1000's)
Value (Million $EC)
NUTMEG
1955
1960
1965
1970

FIGURE 4

Since 1956 the production of bananas has increased at a steady and satisfactory rate. Production of cocoa is higher than it was in the early 1950s prior to Hurricane Janet, while that of nutmegs is still only half its previous figure. It is significant that, despite the recovery and diversification of agriculture since 1956, the value of exports rose from $8,765,741 in 1955 to $9,962,319 in 1968, a growth rate of little more than 1 per cent, which is an unsatisfactory rate of growth even allowing for devaluation of the pound in 1967 and compensatory inflation. The irregularities on the graph showing the percentage earnings of the major crops (Fig. 5) underline the instability of the economy. It should be noted that latterly the economy has been buoyed-up by a wave of inflated prices and protected markets which are unlikely to continue much longer. In 1965 the price of nutmegs rose from 70 cents to 135 cents per pound, owing to political and economic unrest in Indonesia, producer of two-thirds of the world's nutmegs. With the return of a stable government in Indonesia the high price paid for Grenada's nutmegs ended (Fig. 4). In the mid-1960s cocoa prices were also high, as Grenada enjoyed a reputation for producing beans of desirable flavour, but in 1969 prices dropped as world production increased after several seasons of poor harvests. The banana industry of the Windward Islands benefits from a guaranteed outlet on the United Kingdom market, without which their production costs would prohibit their competing with the much cheaper bananas from Central America. With Britain's entry into the European Economic Community, Grenada's banana industry may be in peril unless it can evolve cost-cutting efficiencies.

While the value of exports has crept upwards only slowly and

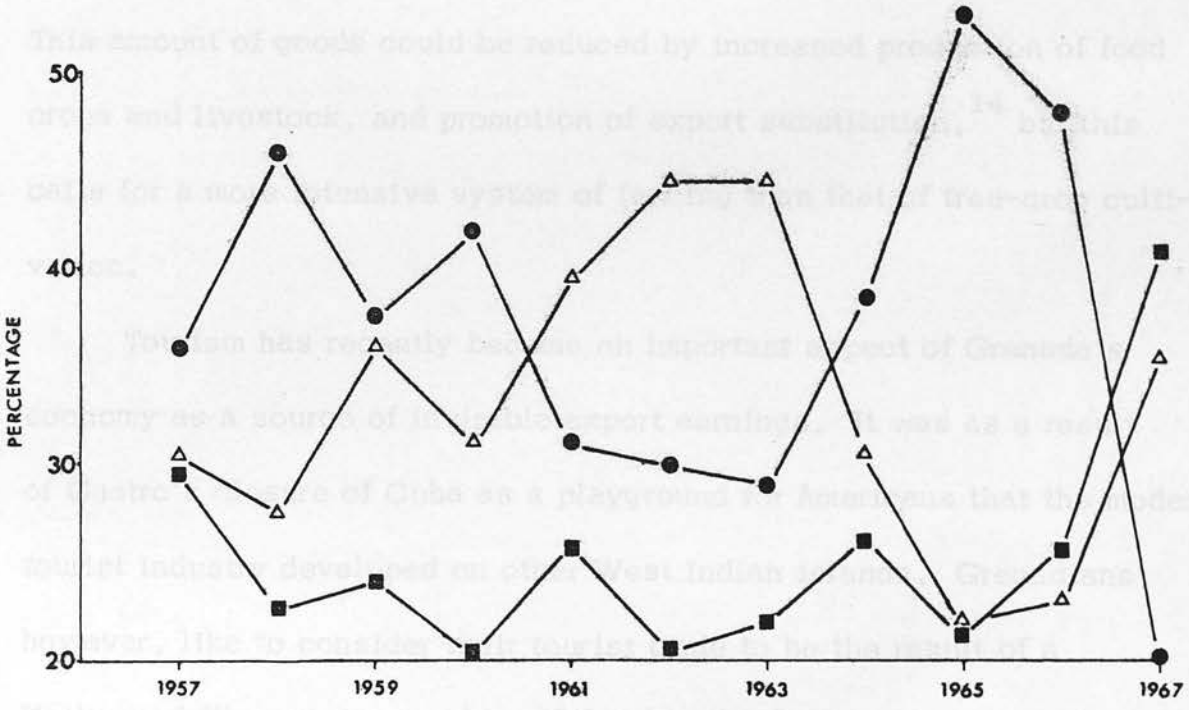
50
40
30
20
PERCENTAGE
1957
1959
1961
1963
1965
1967
PERCENTAGE OF MAJOR EXPORT CROPS OF TOTAL EXPORT VALUE
● BANANAS
△ COCOA
■ NUTMEG & MACE

FIGURE 5

marginally since 1955, the value of imports of both capital and consumer goods has risen steadily and substantially from $8,765,741 in 1955 to $26,389,300 in 1968. This represents an average annual growth of 12.0 per cent in the value of exports, and is particularly disturbing in that it far exceeds the growth in exports or of population. Of the total imports about one-third, by value, regularly consists of foodstuffs, mainly meat and meat products, processed milk and vegetables (Fig. 3). This amount of goods could be reduced by increased production of food crops and livestock, and promotion of export substitution,[14] but this calls for a more intensive system of farming than that of tree-crop cultivation.

Tourism has recently become an important aspect of Grenada's economy as a source of invisible export earnings. It was as a result of Castro's closure of Cuba as a playground for Americans that the modern tourist industry developed on other West Indian islands. Grenadians, however, like to consider their tourist trade to be the result of a Hollywood film company making 'Island in the Sun' on their island in 1956. This film gave widespread publicity to the beauty of Grenada's tropical splendours and was a definite stimulus to the development of tourism. Since then, the growth of tourism has been singularly well-sustained, with stay-over visitors increasing from 4,305 in 1956 to 23,164 in 1968,[15] an average annual increase of 18 per cent (Fig. 6). During this period the estimated revenue from visitors has increased fifteen fold, and in 1968 was assessed at $15,727,250 from stay-over

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14. S. Bethke, Report to the Government of Grenada on Agricultural Marketing Improvement Policy, F.A.O. Rome, 1967, p.15.

15. Grenada Tourist Board, St George's, 1969.

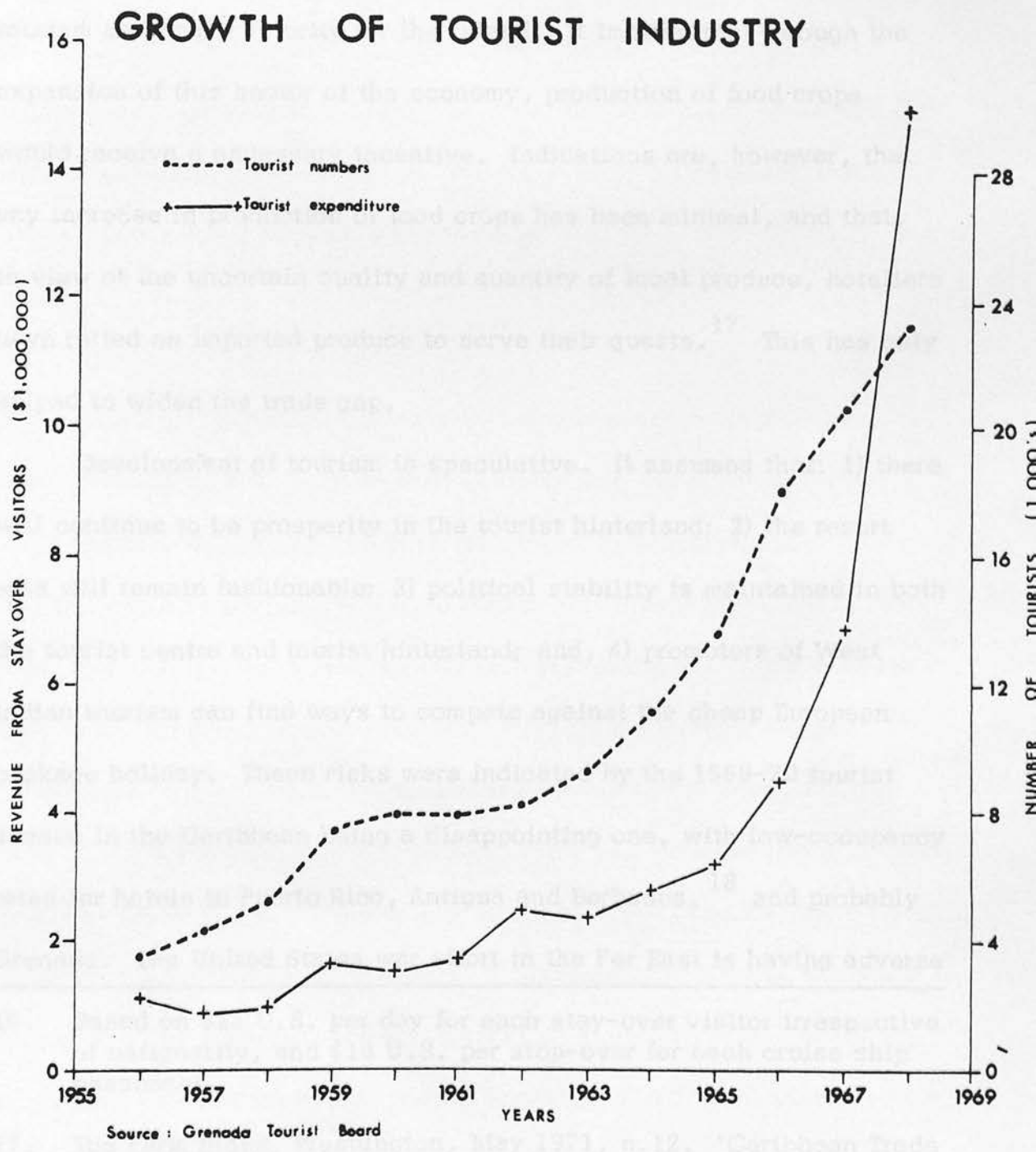
GROWTH OF TOURIST INDUSTRY
Tourist numbers
Tourist expenditure
REVENUE FROM STAY OVER VISITORS ($1,000,000)
NUMBER OF TOURISTS (1,000's)
YEARS
1955
1957
1959
1961
1963
1965
1967
1969
0
2
4
6
8
10
12
14
16
0
4
8
12
16
20
24
28
Source : Grenada Tourist Board

FIGURE 6

visitors and $530,000 from passengers from the 77 cruise ships which called at the island.[16] As this trade generates such income, it is not surprising that economists and politicians have optimistically viewed tourism as the panacea to their economic ailments.

The Tripartite Economic Survey (1966) regards development of tourism as a major priority for the island. It implies that through the expansion of this sector of the economy, production of food crops would receive a necessary incentive. Indications are, however, that any increase in production of food crops has been minimal, and that, in view of the uncertain quality and quantity of local produce, hoteliers have relied on imported produce to serve their guests.[17] This has only helped to widen the trade gap.

Development of tourism is speculative. It assumes that: 1) there will continue to be prosperity in the tourist hinterland; 2) the resort area will remain fashionable; 3) political stability is maintained in both the tourist centre and tourist hinterland; and, 4) promoters of West Indian tourism can find ways to compete against the cheap European package holiday. These risks were indicated by the 1969-70 tourist season in the Caribbean being a disappointing one, with low-occupancy rates for hotels in Puerto Rico, Antigua and Barbados,[18] and probably Grenada. The United States war effort in the Far East is having adverse

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16. Based on $25 U.S. per day for each stay-over visitor irrespective of nationality, and $10 U.S. per stop-over for each cruise ship passenger.

17. The Farm Index, Washington, May 1971, p.12. 'Caribbean Trade Winds Favourable to U.S. Agriculture' (U.S. Dept. of Agriculture, Washington, May 1971).

18. Time Magazine, 30th March 1970, vol. 95, no. 13, p.57.

effects on its economy and as Americans have comprised about 30 per cent of Grenada's stay-over visitors, the largest national and the most affluent group, any reduction in their numbers is a serious blow to their tourist industry. While it may be wrong to presume that the climate for future development of this industry is unfavourable, it is foolhardy to put blind faith in tourism as an economic saviour. It can be hoped that tourism will continue to flourish, and that the revenue it earns will be channelled into other aspects of Grenada's economy, thereby initiating new industries and consolidating the old.

Conclusion

Although Grenada's economy is more diversified than those of other Windward Islands, it is still unstable and the future promises little better. Tree crops, such as cocoa and nutmegs, are prone to wind damage and disease, and are economic liabilities on account of their taking several years to mature. Hurricane Janet exposed the Achilles heel of the economy, and subsequently led to the widespread production of bananas, a crop which has broadened the economic base, but has not substantially strengthened it. Bethke (1967) and Persaud (1968)[19] recognise this economic predicament and emphasize the need for greater production of food crops and livestock, a development in which the small farmer must be regarded as a key figure. A study of small farmers is, therefore, appropriate at this time. Hopefully it will contribute to a greater understanding of the problems to be encountered in developing agriculture along these recommended lines.

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19. Bethke, op. cit.
Persaud, op. cit.

CHAPTER 2

THE PHYSICAL ENVIRONMENT

The nature of agriculture is to a large extent determined by the nature of physical environment, which has considerable variation in Grenada despite the island's small size. In this chapter discussion is centred on those features of this environment which most influence agriculture, namely soils, slope and climate. These, however, are introduced by a brief description of the island's geology and topography.

Geology

Geology *per se* is of relatively little significance to the farming community and for this reason it will be given only a cursory mention as background for later discussion of soils and slope.

The island was built by a series of volcanic eruptions which laid down ash, breccia and lava on a sedimentary platform known as the Caribbean Ridge. During the Pliocene the Caribbean Ridge was uplifted above sea level, and thereafter, following a subsidence of this ridge in the Pleistocene, a violent volcanic orogeny resulted in the major formation of the present island.

Fluctuations in sea level during the Pleistocene and Post-Pleistocene periods account for the presence of raised marine platforms of ash beds and small deposits of marine coralliferous limestone in the north

of the island at an elevation of 600 feet.[1]

In recent times the coastline from Point Salines to Bacolet Point has been sinking so that a ria coastline with well-defined embayments, peninsulas and islands has been formed. By contrast, the northern coastline is emerging, as evidenced by marine terraces about Sauteurs. The axis for these movements is a fault line passing through Lake Antoine, Grand Etang and St George's harbour (Fig. 2). These are volcanic craters, or the remains thereof, which were predominantly pumice vents of the explosive type and issued forth pyroclastic rock with comparatively little lava. In coastal areas, where agriculture is best developed, the regolith is made up of pyroclastic material, agglomerates and tuffs.

Topography

The topography of Grenada, like that of most recently formed volcanic islands in the Caribbean, is imposing. The interior is dominated by a range of mountains whose highest points are Mt St Catherine (2,756 feet), Fedon's Mountain or Camp (2,509 feet) and Mt Lebanon (2,347 feet). From these mountains fast-flowing rivers and streams have dissected the landscape into a complex of V-shaped valleys and hog-back interfluves. Only behind the ria coast in the south and on the alluvial piedmont plain north of Grenville are any extent of rolling hills and level land found (Fig. 2 and Fig. 8). Such a rugged topography offers a formidable challenge to agriculture.

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1. C. Wright, Report by a New Zealand Pedologist on the Geology of Grenada, mimeographed report, 1957.

Introduction to soils and slope

The only definitive work on the soils of Grenada is the soil and land-use survey of 1959 undertaken at the Imperial College of Tropical Agriculture, by the Regional Research Centre of the British Caribbean.[2] This work purports to provide the people of Grenada 'with a rational approach to their land use problems and points the way to better use of their land in the future'.[3] To this end the survey:-

1) distinguishes the major soil groups and their various sub-groups, or types, and maps their distribution;
2) denotes the average slope associated with the soil type on the basis of six categories, A to F, where A has 0-2° slope, B 2-5°, C 5-10°, D 10-20°, E 20-30°, and F greater than 30°;
3) classifies the erodibility of the soils under the conditions of slope;
4) recommends the land use capability of a soil type in a given slope category.

As these data were presented on map sheets it was possible to obtain a break-down by parish of the proportion of land in the various categories of soil, slope and erodibility. This was done on a sample basis, whereby the number of sample points in a parish was proportional to its area. The points were randomly selected, and for each point the soil type, slope and erosion category were noted, and the results tabulated. The discussion which follows is based on these results.

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2. K.C. Vernon, H. Payne, and J. Spector, Soil and Land-use Surveys, No. 9, Grenada, Imperial College of Tropical Agriculture, Trinidad, 1959.
3. Ibid., p.4.

Soil groups

The dominating feature of Grenada's soils is the abundance of clay loams. As a soil group they account for 84.5 per cent of all soils; clays, 11.6 per cent, and sandy loams, 2.9 per cent, represent the other major soil groups, while the remaining 1 per cent consists of salinas and sand. The general pattern of soil distribution can be considered as a base of clay loams, in which clay and sandy loams are interspersed in pockets on coastal margins (Fig. 7).

These various soil groups are discussed separately with mention being made of the appropriate land use for the types of slope.

TABLE 2.1 PERCENTAGE DISTRIBUTION OF SOIL GROUP AND TYPE BY PARISH

Parish	Clay loam								Clays				Sandy loam			Others
	Types								Types				Types			
	Woburn	Capitol	Belmont	Palmiste	Concord	La Tante	Plains	Total clay loams	Perseverance	Hartman	Hope	Total clays	Plains	Bonaire	Total sandy loams	
St George's	50	13	-	-	7	-	-	70	10	12	3	25	2	-	2	2
St John's	39	27	11	14	3	-	-	94	3	-	-	3	-	3	3	-
St Mark's	21	-	52	11	-	-	-	84	11	-	-	11	-	5	5	-
St Patrick's	20	-	49	-	-	3	-	72	17	3	-	20	8	-	8	-
St Andrew's	24	60	4	-	-	-	-	90	6	-	-	6	2	-	-	2
St David's	49	39	-	-	6	-	3	97	3	-	-	3	-	-	-	-
Grenada	35.2	29.1	13.4	3.0	3.0	.4	.4	84.5	7.8	3.0	.8	11.6	2.5	.4	2.9	

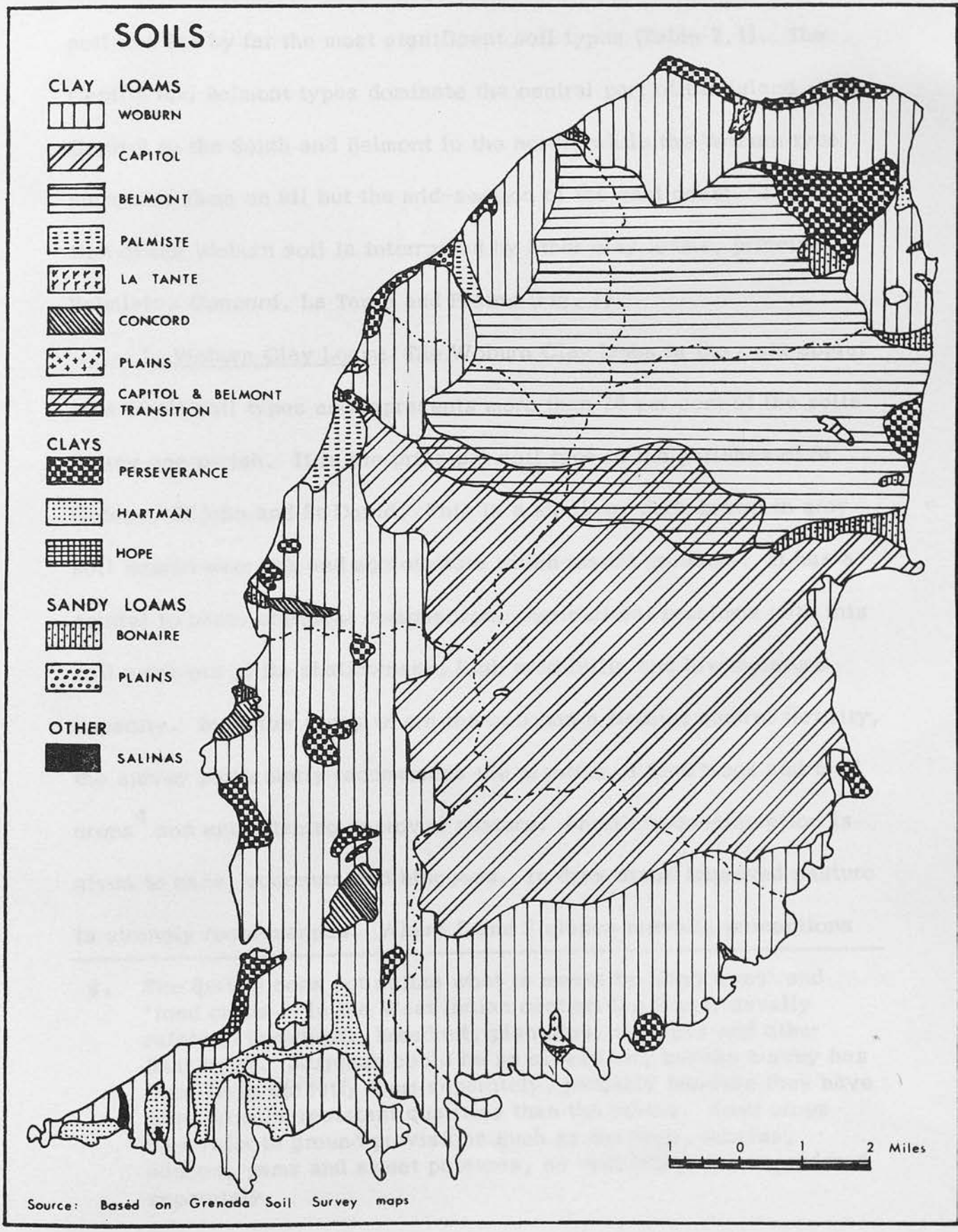
SOILS
CLAY LOAMS
WOBURN
CAPITOL
BELMONT
PALMISTE
LA TANTE
CONCORD
PLAINS
CAPITOL & BELMONT TRANSITION
CLAYS
PERSEVERANCE
HARTMAN
HOPE
SANDY LOAMS
BONAIRE
PLAINS
OTHER
SALINAS
1 0 1 2 Miles
Source: Based on Grenada Soil Survey maps

FIGURE 7

I. Clay Loam group

There are three major types of clay loam, namely Woburn, Capitol and Belmont. Together these constitute 77.8 per cent of the island's soil and are by far the most significant soil types (Table 2.1). The Capitol and Belmont types dominate the central part of the island, with Capitol in the South and Belmont in the north, while the Woburn type surrounds them on all but the mid-section of the east coast. Distribution of the Woburn soil is interrupted by other clay loams, principally Palmiste, Concord, La Tante and Plains (Fig. 7).

1. Woburn Clay Loam: The Woburn Clay Loam is the most ubiquitous of all soil types and represents more than 20 per cent of the soils in any one parish. It is the principal soil type in the parishes of St George, St John and St David. This is a shallow, dark-brown to grey soil formed over ash and agglomerate which permit drainage. It has a neutral to basic chemical composition. Agricultural problems with this soil arise out of its shallowness, high erodibility and low moisture capacity. In wetter areas where the soil has a medium neutral fertility, the survey particularly recommends the planting of food trees and food crops[4] and establishing improved pasture. Ancillary consideration is given to cane, coconuts and bluggoes. In drier areas improved pasture is strongly recommended. Where E and F slopes prevail, precautions

4. The Survey does not define what is meant by 'food trees' and 'food crops'. In the West Indian context the former usually refers to breadfruit, breadnut, plantains, mangoes and other fruit trees. Bluggoes could be so classified, but the survey has seen fit to classify them separately, probably because they have more drought-resistant qualities than the others. Food crops here refer to ground provisions such as dasheen, tannias, eddoes, yams and sweet potatoes, as vegetables are considered separately.

against erosion must be taken in the form of contour drains and grass barriers.

2. Capitol Clay Loam: Capitol Clay Loam is the second major soil type. It is the dominating soil in St Andrew's parish and occurs in lessening proportions in St David's, St John's and St George's (Table 2.1 and Fig. 7). From its brick-red colour it is also known as 'Red-Earth'. Although it is found over deeply weathered igneous rocks it has an acidic quality, and is of medium natural fertility. Except for parts of eastern St Andrew's parish, the slopes on which this soil is found are steep, E and F categories, hence strict soil conservation measures are a prerequisite for successful farming. On such slopes cocoa, coffee, nutmegs and food trees can be grown, while on gentler, less-erodible slopes, food crops and bananas can be added to the cultivation.

3. Belmont Clay Loam: In the northern half of the island the dominant soil is the Belmont Clay Loam and this is the principal soil type in St Mark's and St Patrick's parishes. It is a 'Brown-Earth' and has been developed on ash and agglomerate and therefore is well drained. Of the three major soil types it is the most naturally fertile, being medium-high to high. Unfortunately it frequently contains stones and boulders or has steep slopes subject to erosion and landslides. This makes it unsuitable for cultivation and the survey suggests that about half of this soil should remain in natural forest and timber. Where slopes are less than 25^{o} cocoa, coffee, nutmegs, food trees and improved pasture are recommended, but only after conservation measures have been taken. Sould there be gentle slopes then bananas, bluggoes, food crops and vegetables can be cultivated.

4. Palmiste Clay Loam: In small areas of St John's and St Mark's parishes, Palmiste Clay Loam is found. It is a brown soil of medium-high natural fertility and has developed over tuffaceous shales. This soil is especially suited to cocoa, coffee, food crops and food trees.

5. Concord Clay Loam: The Concord Clay Loam is present only in St George's and St John's parishes. It is a black or dark-brown, heavy soil with good water retention and a certain resistance to erosion. The growing of food trees is especially recommended, with ancillary consideration given to cocoa, cane, coffee, food crops and improved pasture.

6. La Tante and Plains Clay Loams: Both La Tante and Plains Clay Loams have limited distribution. They are alluvial soils with a high natural fertility and are consequently suitable for a variety of crops.

II. Clay group

Three main types of clay are found in Grenada, namely the Perseverance, Hartman and Hope varieties. Of these, the Perseverance Clay is the most ubiquitous, however, it comprises only 7.8 per cent of all soils (Table 2.1).

1. Perseverance Clay: Perseverance Clay has a widespread distribution and is found in all parishes, but especially in St Patrick's where it constitutes 17 per cent of the parish soils. Its location is often littoral, although some pockets are found inland in St George's and St Patrick's parishes (Fig. 7). Despite the fact that slopes are gentle to moderate and erosion is not a hazard, this soil is probably the most difficult to work in Grenada[5] (as suggested by its name)

5. Ibid., p.15.

since it has poor drainage and is heavy. If efficient drainage is implemented, then the soil is suitable for food crops, food trees, improved pasture and cane.

2. Hartman Clay: In the south-west corner of the island the major deposits of Hartman Clay are found. This heavy colluvial soil is characterized by gentle slopes. Although it is difficult to work in either the wet or the dry season, the survey recommends that it be used for cane and improved pasture, with secondary consideration given to coconuts and food crops.

3. Hope Clay: Hope Clay is found in a small pocket behind Grand Anse Beach. This poorly drained alluvial soil has little alternative use other than improved pasture.

III. Sandy Loam group

Of the major soil groups the sandy loams are the least represented, 2.9 per cent, and yet the most agriculturally desirable, as they are easily worked, afford good drainage and have a high natural fertility. There are two main types, Plains and Bonaire.

1. Plains Sandy Loam: Of the soils found in Grenada one of the best is the Plains Sandy Loam. This light alluvial soil, occasionally found near river mouths, has good drainage, is naturally fertile, and has a level surface; consequently it is ideal for the intensive cultivation of bananas, bluggoes, cocoa, food crops and vegetables.

2. Bonaire Sandy Loam: Bonaire Sandy Loam is found in St John's and St Mark's parishes. On account of its stony composition and locality at river mouths which are subject to periodic flooding, it has

limitations for cultivation. However, bananas, bluggoes, cocoa, coconuts, food crops and vegetables can be grown.

Other soils

Scattered along the south coast are patches of salinas which afford no agricultural value save a salt lick for livestock. Along the northern half of the east coast is an area of sand dunes. It is advisable that grass and coconuts be planted here so as to arrest any migration of sand inland.

Slope and soil erosion

Agriculture in Grenada is hindered as much by the degree of slope as by the type of soil. Allusions to these implications of slope have been made in discussion of land capability of the soils, but their importance warrants elaboration.

Level land is at a premium, as only 6.3 per cent of the island has a slope of less than 5^{o} and 14.9 per cent less than 10^{o} (Table 2.2). Such land is found in the narrow valleys of the ria coast and along the north-east coast (Fig. 8). Unfortunately in both areas much of the soil is either Hartman or Perseverance Clays and therefore is of limited agricultural use. At the other extreme, 60 per cent of the island's surface is in slope greater than 20^{o}, or slope categories E and F. This includes the interior of the island and sections along the north-west coast. The use of such slopes is restricted to tree crops and natural forest.

From Table 2.2, which gives the proportion of the parishes in the various slope categories, it is seen that St George's, St Patrick's and

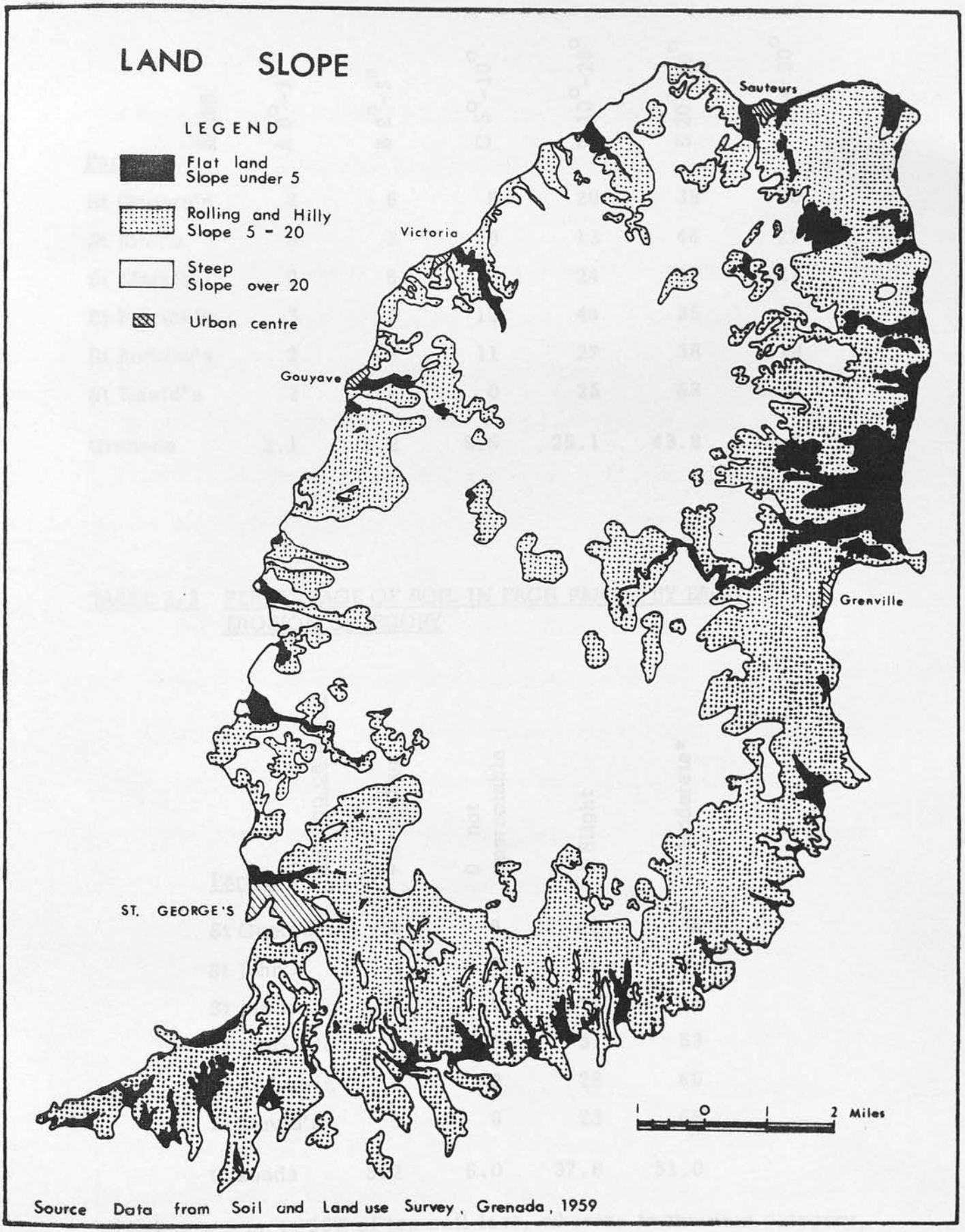
LAND SLOPE
LEGEND
Flat land
Slope under 5
Rolling and Hilly
Slope 5 - 20
Steep
Slope over 20
Urban centre
Sauteurs
Victoria
Gouyave
Grenville
ST. GEORGE'S
0
2 Miles
Source Data from Soil and Land use Survey, Grenada, 1959

FIGURE 8

TABLE 2.2 PERCENTAGE AREA OF EACH PARISH BY SLOPE CATEGORY

Parish \ Slope	A 0°-2°	B 2°-5°	C 5°-10°	D 10°-20°	E 20°-30°	F over 30°
St George's	2	6	9	20	38	25
St John's	3	3	8	13	46	27
St Mark's	0	6	0	24	49	21
St Patrick's	3	6	10	46	35	13
St Andrew's	2	4	11	27	38	18
St David's	2	2	0	25	63	9
Grenada	2.1	4.2	8.6	25.1	43.8	16.2

TABLE 2.3 PERCENTAGE OF SOIL IN EACH PARISH BY EACH EROSION CATEGORY

Parish \ Erosion category	+ Accretion	0 not appreciable	1 Slight	2 Moderate*
St George's	4	9	41	36
St John's	3	0	58	39
St Mark's	6	0	50	44
St Patrick's	3	13	31	53
St Andrew's	3	8	29	60
St David's	9	0	23	69
Grenada	5.2	6.0	37.8	51.0

* Moderate = up to 50% of top soil lost, whereas in the next category, Severe, all the topsoil is lost including some subsoil

St Andrew's have a greater representation in the six slope categories than do the remaining parishes, and this feature should permit more agricultural diversity. St Mark's parish, on the other hand, has less variation, so that one might expect to find it to be less diversified, as the amount of cultivable land is restricted.

With a high proportion of steep land, erosion becomes a major problem and soil conservation a necessary part of successful agriculture. However, there is not necessarily a direct relationship between degree of slope and the extent of erosion, since there is variation in the erodibility of different soil types. This can be observed by comparing Tables 2.2 and 2.3 for the parishes. For example, in St John's, where 73 per cent of the land is in slope greater than 20^{o}, only 39 per cent of the soil is in erosion category 'moderate', while for St David's the corresponding figures are 72 per cent and 69 per cent. Thus erodibility of soil is another factor influencing the nature of farm production. However, it can largely be checked by using the appropriate methods of soil conservation, namely a network of contour and down drains, grass barriers above the contour drains, a cover crop during the wet season, and land in permanent cultivation such as tree crops or improved pasture.

Climate

Of the various aspects of the physical environment climate is the least documented, mainly because there is a paucity of reliable data which has a continuous record for any length of time. This absence of data reflects the general lack of local scientific interest in climate.

Most of the island has a sub-humid, tropical climate which is

characterized by a summer maximum of precipitation, and generally high year-round temperatures (over 80°F). The island can be divided into three climate regions according to Köppen's classification. In the interior of the island where the elevation exceeds 500 feet, an Af, or tropical wet climate, is delimited. For most of the coastal periphery below 500 feet, rainfall is less than 2.4 inches for the driest month, and hence has an Aw, or tropical wet and dry climate. Although records of temperature and rainfall are inadequate to support the claim that the south-west corner of the island has a BSh, 'hot' steppe, climate, the presence of xerophytic vegetation here strongly suggests it (Fig. 9).

Temperature variations over the island are in accordance with altitude. The low coastal lands have a range of temperature between 78°F and 95°F during the day, and between 65°F and 75°F during the night. In the highlands the corresponding temperatures will be as much as 7° cooler. Such temperatures provide a year-long growing season.

A typical seasonal range in temperatures for areas below 500 feet is shown in Table 2.4.

TABLE 2.4 MEAN ANNUAL TEMPERATURE (°F),
Richmond Hill, St George's parish, elevation 496 feet

J	F	M	A	M	J	J	A	S	O	N	D
78.5	78.3	79.7	80.8	81.3	81.0	80.7	81.9	81.7	82.7	80.7	79.0

Annual Mean 80.5

Source: F.L. Wennstedt, World Climate Data, Latin America and the Caribbean, n. pub., 1961, p.86.

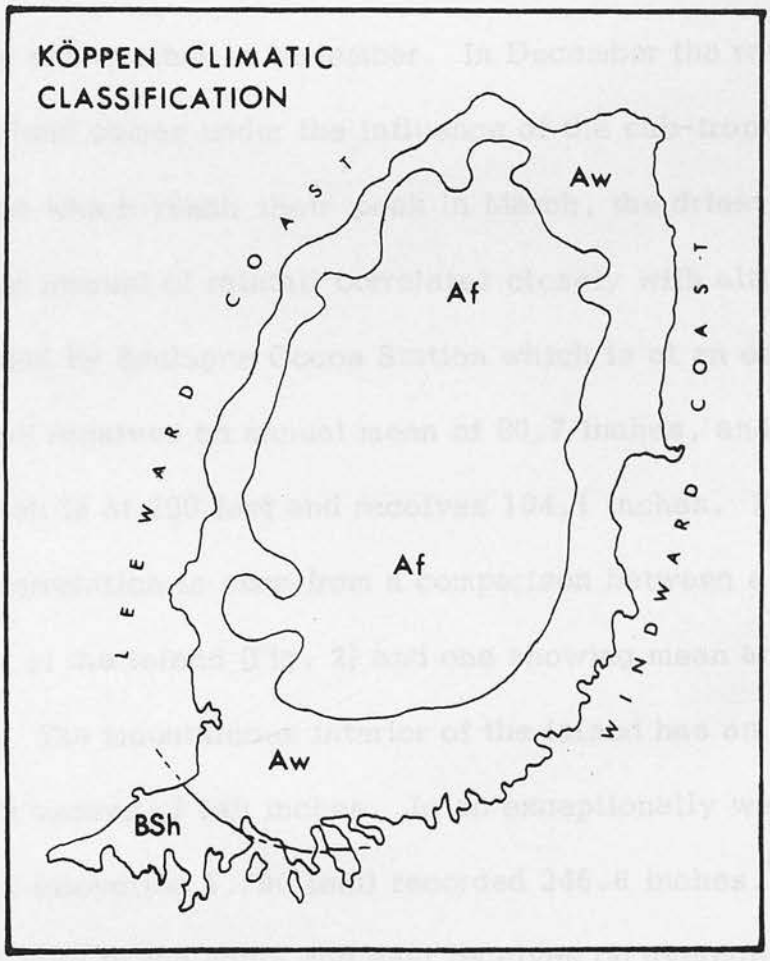
KÖPPEN CLIMATIC
CLASSIFICATION
Aw
Af
Af
Aw
BSh
LEEWARD COAST
WINDWARD COAST

FIGURE 9

The rainfall regime divides the year into alternate dry and wet seasons. The former usually extends from January until the end of May; the latter, during which 70-80 per cent of the annual rainfall is received, for the remainder of the year. Figure 10 shows this regime for two agricultural stations on opposite sides of the island: one at Maran in St John's parish, the other at Boulogne in St Andrew's. Their regimes are similar and are characterized by two maxima in rainfall, one in June or July and another in November. In December the rainfall declines as the island comes under the influence of the sub-tropical high pressure cells which reach their peak in March, the driest month on the island. The amount of rainfall correlates closely with altitude and this is indicated by Boulogne Cocoa Station which is at an elevation of 150 feet and receives an annual mean of 80.7 inches, and Maran Cocoa Station which is at 200 feet and receives 104.1 inches. Further evidence of this correlation is seen from a comparison between a map showing the relief of the island (Fig. 2) and one showing mean annual rainfall (Fig. 11). The mountainous interior of the island has an annual rainfall average in excess of 140 inches. In an exceptionally wet year, 1938, Grand Etang (elevation 1,790 feet) recorded 246.6 inches.[6] The low-lying coastal land in the south and east receives on average less than 40 inches. In 1942 Point Salines at the south-west tip of the island received as little as 22.4 inches.

Both relative humidity and percentage of cloud are affected by the wet season, as Table 2.5 indicates.

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6. Knight, op.cit., p.289.

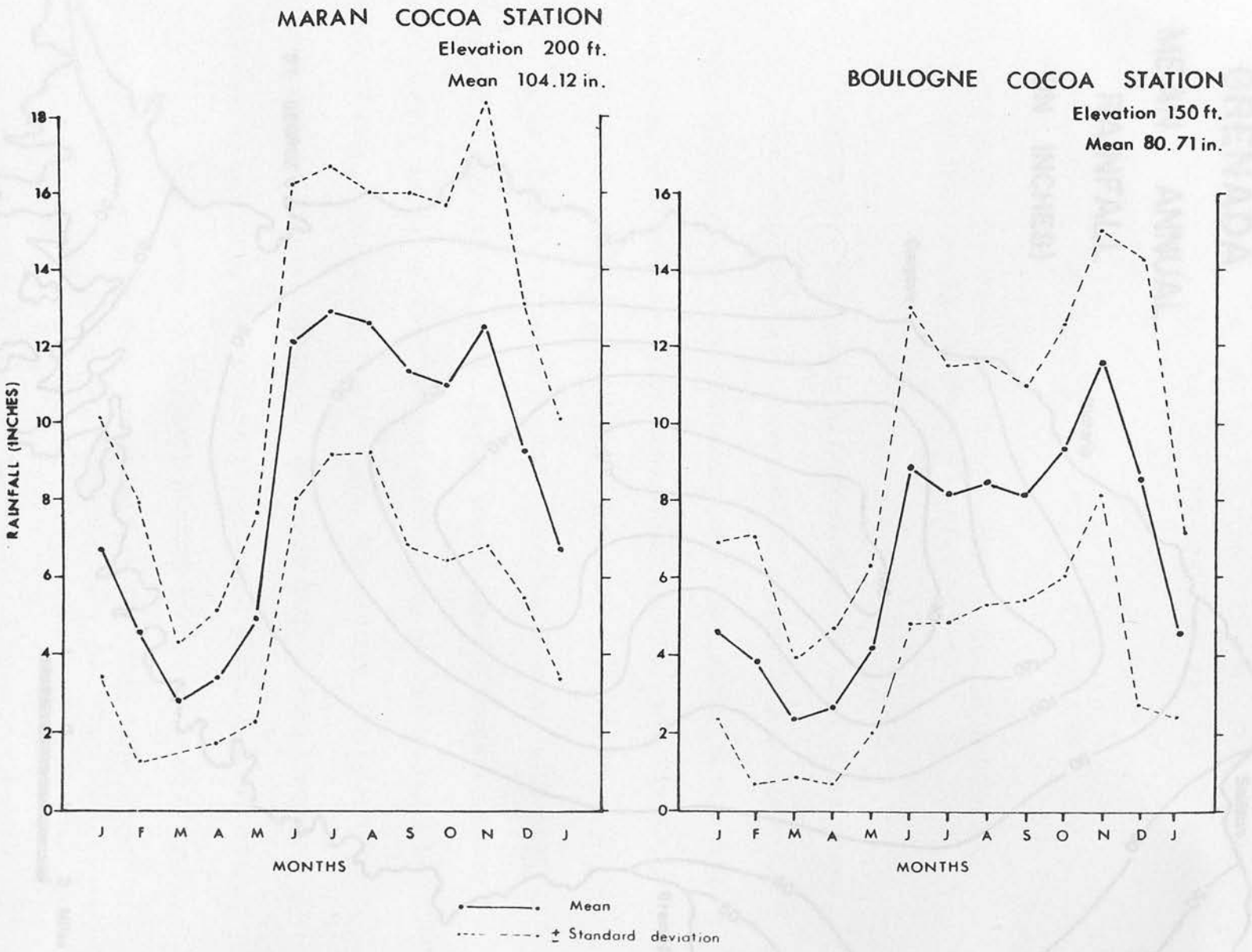

FIGURE 10 Rainfall Regimes

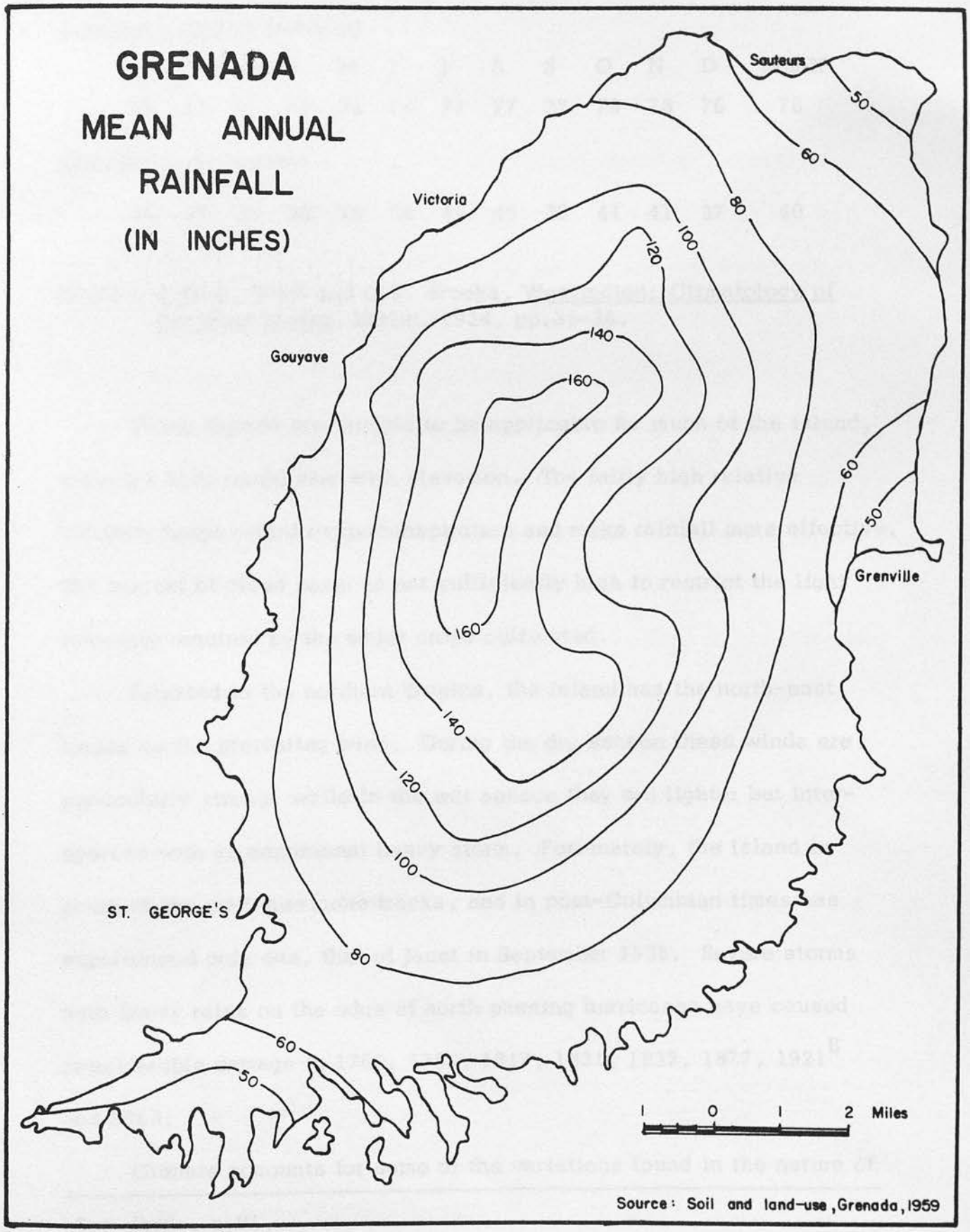
GRENADA
MEAN ANNUAL
RAINFALL
(IN INCHES)
Sauteurs
Victoria
Gouyave
Grenville
ST. GEORGE'S
50
60
80
100
120
140
160
160
140
120
100
80
60
50
60
50
1 0 1 2 Miles
Source: Soil and land-use, Grenada, 1959

FIGURE 11

TABLE 2.5 RELATIVE HUMIDITY AND CLOUDINESS
Richmond Hill, St George's parish, elevation 509 feet

Relative humidity (percent)

J	F	M	A	M	J	J	A	S	O	N	D	MEAN
75	73	71	72	74	74	77	77	77	79	78	76	76

Cloudiness in percent

34	32	32	38	45	52	44	45	39	41	41	37	40

Source: R.D.C. Ward and C.F. Brooks, Westindien: Climatology of the West Indies, Berlin, 1934, pp.35-36.

These figures are thought to be applicable for much of the island, although both would vary with elevation. The fairly high relative humidity helps retard evapotranspiration and make rainfall more effective. The amount of cloud cover is not sufficiently high to restrict the light intensity required by the major crops cultivated.

Situated in the northern Tropics, the island has the north-east trades as the prevailing wind. During the dry season these winds are particularly strong, while in the wet season they are lighter but interspersed with an occasional heavy storm. Fortunately, the island is south of the main hurricane tracks, and in post-Columbian times has experienced only one, that of Janet in September 1955. Severe storms with heavy rains on the edge of north passing hurricanes have caused considerable damage in 1768, 1780, 1817, 1831, 1832, 1877, 1921[8] and 1963.

Climate accounts for some of the variations found in the nature of

8. Ibid., p.91.

small farm production. This variation is mainly due to the varying degrees of severity of the dry season which in many areas is sufficiently long to restrict the cultivation of certain crops.

Conclusion

Of the various aspects of the physical environment, topography represents the major obstacle to agriculture. As Pere Labat noted on his brief visit to the island in 1700, 'the land is rich and watered by many rivers' and 'if cultivated should produce a great deal'.[9] This astute observation is for the most part correct. Soils are generally fertile, although they tend to have a slight deficiency in phosphorus typical of soils of volcanic origin, and a few also lack nitrogen and total lime.[10] These deficiencies can be overcome by application of the appropriate fertilizer. Agriculture is not seriously affected by climate as much of the island receives adequate rainfall for year-round cultivation. In making his observation Labat did not consider, or perhaps did not appreciate, factors of slope and erodibility which limit cultivation in the heart of the island and make soil conservation measures necessary in many other parts of the island.

The physical environment shows appreciable differences between the parishes. Whereas the variety of slope and climate in St John's and St Mark's is relatively slight, the variety in St George's and St Patrick's is particularly striking, thereby permitting a more diversified

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9. Pere Labat, The Memoirs of Pere Labat 1693-1705, translated and abridged by J. Eaden, Frank Cass and Co. Ltd., London, 1970, p.135.

10. J.B. Harrison, The Rocks and Soils of Grenada and Carriacou, London, 1896, p.23.

agricultural response. The extent to which the physical environment affects agriculture becomes evident in the chapters which investigate the nature of small farming.

CHAPTER 3

THE SOCIAL-ECONOMIC LANDSCAPE

While the previous chapter outlined the nature of the physical environment as it affects agriculture, this chapter examines levels of social and economic development as an aspect of the cultural environment. The matrix of social and economic criteria which indicate the level of development is referred to by Ginsburg and Berry (1961) as the social-economic landscape,[1] a term hereafter employed in this thesis. It was hypothesized that differences in this landscape would influence the nature, structure and level of farming practices. Thus, if different levels of development could be established between Grenada's six parishes, it would then be reasonable to expect related parochial differences in agriculture. One could hope to proceed by discerning aspects of the landscape which influence the development of small farming, and so investigate some of Blaut's so-called 'toxic' factors which he considers to be 'unknown and incurable, which ... inevitably attack any peasant development program and in the end defeat it'.[2]

Examination of this landscape will also provide additional background information, and enable subsequent discussion of small farming to be made in greater context.

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1. N.S. Ginsburg and B.J. Berry, Atlas of Economic Development, University of Chicago, 1961, p.7.

2. Blaut, op. cit., p.205.

Measuring the social-economic landscape

Different stages of development in the social and economic landscape are determined by considering levels of living.[3] Measures of levels of living have been a major consideration of the United Nations for the past two decades, as the promotion of 'higher standards of living' is an integral part of their Charter. The majority of studies on this topic are concerned with determining differences in 'levels of living' between nations, rather than between national sub-divisions such as provinces, counties or parishes. The criteria used in making such comparisons, although not directly relevant, nevertheless indicate the nature of the social economic matrix to determine levels of living. The United Nations suggest use of the following components as indices:-

1 Health including demographic conditions
2 Food and nutrition
3 Education including literacy and skills
4 Conditions of work
5 Employment situation
6 Aggregate consumption and savings
7 Transportation
8 Housing, including household facilities
9 Clothing
10 Recreation and entertainment
11 Social security
12 Human freedoms [4]

As Moser (1957) points out, the significant fact about this list is that 'it goes far beyond the purely financial and economic indicators of

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3. 'Levels of living' as defined by the United Nations refers to the actual living conditions of a people, while 'standards of living' are the 'aspirations or expectations of a people, that is the living conditions which they seek to attain or regain, or which they regard as fitting and proper for themselves to enjoy'.

4. United Nations, Measures for the Economic Development of Under-Developed Countries, New York, 1951.

progress'[5] which too often are used in ranking levels of development. Although conscious of this shortcoming, Ginsburg and Berry consider the index of Gross National Product to be 'the most useful synthetic indicator to a state of poverty or wealth among nations'.[6] They recognise this to have two fundamental failings, namely:-

1) it gives no description of the social-economic landscape of a nation;

2) it implies all nations to be intrinsically the same despite direct observations detecting notable variations.[7]

The United Nations recognize the complexity of this landscape, but they do not suggest any method by which a hierarchy of development might be established by integrating social and economic criteria. In many instances this is impossible because deficiency of data prevents the making of direct practical comparisons. Human freedom and happiness are concepts which are not readily measurable as they involve subjective evaluation. Consequently, Moser in his Jamaican study restricted his criteria to those pertaining to nutrition, education, health and housing. These, he contends, must inevitably be associated with the elusive concept of happiness, as general happiness is unlikely without food and health.

Many of the problems associated with the analysis of national levels of living may not exist when sub-divisions of a country are considered, since what data are available for these divisions have

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5. C.A. Moser, The Measurement of Levels of Living, with Special Reference to Jamaica, HMSO, London, 1957, p.7.
6. Ginsburg and Berry, op. cit., p.8.
7. Ibid.

usually been collected at the same time using standardized techniques, and hence are directly comparable. This is generally true of statistics related to Grenada's parishes. However, other problems are present, as many sets of criteria with a break-down by parish become meaningless when investigated closely because the parish boundary has been transgressed, indicating that probably the data were not intended for use at this level. In some instances data were either not readily available, having been filed alphabetically or by regions other than parishes, e.g. compass quadrants, or not accessible because they were confidential. All data that were classified at the parish level were collected and considered as possible indices of parochial levels of living. If they were meaningful, they were classified as either social (non-material) or economic (material) indicators. This permitted a comparison between the social and economic landscapes, prior to a composite evaluation of the social-economic hierarchy.

Methodology: establishing a hierarchy

Initially the social and economic categories were considered as distinct sets of variables. When a set of data was thought meaningful (i.e. its distribution showed a definite order between the parishes and there was a substantial difference between maximum and minimum values), the parishes were ranked from one to six according to the accepted norms of development. For example, the parish with the lowest percentage of agricultural workers in the total labour force would be ranked first, similarly for the parish with the highest percentage in the professional class. Where two parishes had the same value, an average rank was assigned to both.

Although some criteria were undoubtedly more important than others, there was no suitable technique for measuring this, because the number of parishes, six, was inadequate for any statistical technique to be employed for weighting the various components. In an attempt to alleviate this problem, mutually inclusive components of a given aspect of the landscape were considered and, by ranking each of them, additional emphasis was given to that aspect. For example, the transportation network is an important aspect of the economic landscape, and, in recognition of this importance, both road density and the cyclomatic number[8] of the road system were ranked for each parish.

Another problem was the inability to standardize the data on a time scale, as data on different criteria had been collected in different years. Where possible, data were standardized by relating the distribution of phenomena in a given year to the estimated population of the parish for that year.

When all the variables in both categories were ranked, the sum of the rankings was obtained for each parish. A 'mere summing of the rankings is the best estimate of "true" ranking'.[9] The parish with the lowest rank total was the most advanced; the highest, the least advanced.

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8. Cyclomatic number μ is a measure of connectivity which is equal to the number of arcs minus the number of nodes. See Chapter 13 in Quantitative Geography, J.P. Cole and C.A.M. King, London, 1968.

9. S. Seigal, Nonparametric Statistics for the Behavioral Science, New York, 1956, p.238.

Social components

Outstanding amongst social criteria are those of general demography. For much of the tropics statistics on this subject have a low order of reliability, but this is not so for Grenada, whose latest population census, 1960, was supervised by the Central Statistical Office of the Government of Trinidad and Tobago. The census has a break-down by parish which allows comparisons to be readily made.

Population density was considered an important variable on an island where physiography of the parishes is broadly similar, in that each parish has a coastline and mountainous slopes. There is marked differentiation in density, from 1,026 persons per square mile in St George's parish to 432 in St Mark's in 1960. The intercensal population growth rate from 1946 to 1960 provides an index of economic, as well as social, viability. Of the parishes, St George's has the largest increase, 36.3 per cent, followed by St Andrew's with 25.9 per cent and St David's with 25.1 per cent, while St John's is remarkable for its low increase of 8.4 per cent, or a mean annual growth rate of 0.6 per cent. The proximity of St George's Town is a powerful social magnet for the population of St John's, a fact which is supported by the composition of the labour force, as professional, managerial, administrative, and personal service classes are poorly represented in St John's. In St David's, too, the percentage figures for professional and managerial classes are low, and possibly reflect the lack of a parish town. In contrast, St George's has 9.4 per cent in the professional class, twice that of any other parish. Proportions employed in personal services are similar, with 19.5 per cent in St George's parish and 8.4 per cent in

St David's. The high degree of development in St George's parish relative to the other parishes, is best exemplified by the low level, 20.1 per cent, of those with agricultural employment. The corresponding value for the other parishes exceeds 47 per cent, the highest being St John's with 62.2 per cent (Table 3.1).

With regard to education, the attainment of the population in St George's parish is again notable, as 15 per cent of those over fifteen years of age have received secondary education, a proportion thrice that of any other parish. Also only 2.9 per cent of the inhabitants of St George's parish had received no education, as compared with 11.9 per cent in St Mark's, the parish with the highest proportion. Such values have been distorted by inter-parish migration, as the more educated the population, the greater its mobility, for it is attracted by greater opportunity and remuneration in more developed areas. Thus migration is indicative of the prevailing social and economic climate; a barometer of which is the ratio of females to males. It is hypothesised that the higher this ratio, the greater the need for the male to leave his home and seek his future outside the limited sphere of his own environment. St George's has a ratio considerably lower than that of the other parishes, while St Patrick's and St Mark's have the highest (Table 3.1), suggesting both a lack of occupational opportunity and, possibly, a spirit of enterprise among their menfolk.

Other parameters of social conditions were examined and found to be valueless for present purposes. For example, it was hoped that birth, death and infant mortality rates would be important indices of general living conditions and public health development. Although these

TABLE 3.1 RANKINGS OF SOCIAL CRITERIA ON A PAROCHIAL BASIS

	Demography			Education			
Parishes / Variables	Popn. density 1960 persons/sq. mile	% intercensal rate of popn. growth 1946-60	Ratio of females per 100 males	% popn. over 15 yrs. with no education	% popn. over 15 yrs. with secondary education	1967 primary school pupils per qualified or certified teacher*	% attendance primary school of enrolment 1961-67
St George's	1026 (1)	36.3 (1)	105.9 (1)	2.9 (1)	15.0 (1)	91.0 (1)	82.9 (1)
St John's	530 (4)	8.4 (6)	118.4 (4)	10.0 (3)	2.8 (6)	155.8 (5)	76.1 (5)
St Mark's	432 (6)	16.3 (4)	122.0 (5)	11.9 (6)	4.0 (4)	118.0 (3)	81.5 (2)
St Patrick's	691 (2)	13.2 (5)	123.5 (6)	11.4 (5)	4.3 (3)	103.5 (2)	81.1 (3)
St Andrew's	644 (3)	25.9 (2)	116.5 (3)	10.6 (4)	5.0 (2)	146.7 (4)	78.2 (4)
St David's	506 (5)	25.1 (3)	114.1 (2)	5.5 (2)	3.7 (5)	178.3 (6)	71.6 (6)

Data from 1960 Grenada Population Census

* Data from Dept. of Education, St George's

TABLE 3.1

Parishes / Variables	Labour force: % professional	% managerial or administrative	% personal service	% skilled manual	% employed in agriculture	Sum of ranking
St George's	9.4 (1)	5.2 (1)	19.5 (1)	24.6 (1)	20.1 (1)	Rj=12
St John's	3.2 (5.5)	2.7 (5)	5.5 (6)	11.3 (5)	62.2 (6)	Rj=60.5
St Mark's	3.3 (4)	3.3 (3)	7.4 (5)	10.7 (6)	55.2 (5)	Rj=53
St Patrick's	4.1 (2)	3.1 (4)	8.0 (4)	11.5 (4)	49.5 (3)	Rj=43
St Andrew's	3.4 (3)	3.4 (2)	8.2 (3)	15.0 (3)	50.5 (4)	Rj=37
St David's	3.2 (5.5)	2.2 (6)	8.4 (2)	15.8 (2)	48.4 (2)	Rj=46.5

data were not available from the Census, they were obtained from the Registrar General's office. They showed almost an inverse to what had been expected, as St George's parish had a birth rate of 38.6 and a death rate of 12.8 per 1,000 persons in 1968. These compared to an island average of 29.2 births and 8.0 deaths per 1,000 persons in that year. Investigation of the records revealed that births and deaths were registered in the parish where they occurred, and not where the mother or deceased person was domiciled. Furthermore, there were no means of determining the place of residence. These figures resulted from the location of the two hospitals, one in St George's Town, the other near Grenville, St Andrew's parish, and of a geriatric nursing home in St George's parish. Hence expectant mothers, the sick and the aged from all parts of the island gravitated to these centres in time of treatment, with the result that births and deaths were higher than average in St George's and St Andrew's. These statistics were therefore invalid on a parish basis.

Medical services provided another aspect of the social category which could not be ranked. Although this government-operated service is available in all parishes, differences in the frequencies with which clinics are held, in the facilities and in the quality of staff in attendance, were so variable that any comparative evaluation of services was impossible. Moreover, many of the sick and injured would seek treatment at the hospitals rather than at their local clinics, so that figures of patients at local clinics are misleading. The organization of the medical service, like others on the island, has had a political-administrative basis and not a parochial one.

The ranking of individual criteria is given in Table 3.1, and the cumulative rank order and statistical results in Table 3.2. The sum totals of the rankings show a fairly well-defined order with no major clustering effect. It results, not surprisingly, in the supremacy of St George's parish which ranked first in all twelve variables. St John's is in last place; one it commonly held as indicated by its low coefficient of variance, V = 19. Kendall's Coefficient of Concordance for all the ranking had a value W = .56, indicating there is significant agreement in the rankings.

TABLE 3.2 SOCIAL FACTORS

Rank	Sum of ranking	Mean ranking	Standard deviation	Coefficient of variance
Rs	Rj	Rj/n	O	V
1 St George's	12.0	1.00	0.00	0
2 St Andrew's	37.0	3.08	0.79	26
3 St Patrick's	43.0	3.58	1.31	37
4 St David's	50.5	4.20	1.07	25
5 St Mark's	53.0	4.42	1.59	43
6 St John's	60.5	5.04	0.96	19

Economic components

Analysis of economic components of levels of living presented more problems than those encountered with the analysis of social components. This was because many of the data were not readily available at the parish level, while other data were classified as confidential by government or company officials. Such limitations restricted the nature of the economic components and excluded some of the important ones, namely income-tax returns, thus no direct index of the earning power of the population in each parish was available. In lieu of such

definitive information, other indices of per capita income were used. These included licensed motor vehicles, housing types and household facilities. Data for 1968 regarding the type of vehicle and the address of the owner were obtained from the Department of Income Tax and Inland Revenue. To add weight to this aspect of economic well-being, two sets of variables were ranked, that of cars, vans, jeeps and Land Rovers, and that of trucks. The same department supplied data on radio licences, but these were discarded because they were found to be unreliable since government officials did not appear concerned with the annual renewal of radio licences. From the telephone directory and the local office of the Cable and Wireless Company, the number of telephones per parish and the intensity of calls per telephone per month were obtained. These proved meaningful indices and were included in the analysis.

An index of housing conditions was obtained from the 1960 Population Census, where the number of private dwelling places with a given number of rooms is recorded for each parish. As most (63 per cent) Grenadian houses are one- or two-roomed structures of varying size and quality, the percentage of houses with four or more rooms was therefore arbitrarily chosen as an indicator of higher purchasing power among the owners of these private dwellings. Such houses tended to exhibit greater consistency in quality and structure. Further insight into levels of living is gained from the toilet facilities available at private dwelling places. The criteria used were the percentages of houses with a water closet and of those with no facilities. The other possibility, a pit latrine, was not considered as it was related to the other two and would have given more weight to this aspect than was warranted.

The availability of services and use of statutory undertakings were other useful indices of economic development. The Grenada Electricity Service (G.E.S.) permitted access to their 1967 records (the 1968 figures were not available as the company's annual report for that year had not been made public) whence the average annual rate per domestic and commercial consumer were determined. Unfortunately, in that year electric power was not available in St Mark's parish, so for both these components this parish was ranked last. This ranking has some justification since G.E.S. would have installed power where ten or more households in a given area had requested it. The extent to which facilities for piped water are available is indicated by the distribution of both the supply main (four inch pipe) and the distribution main (two inch pipe) in proportion to population density. This gave a meaningful index. Water rates for each parish per 1,000 persons were adopted as an index of usage and convenience of service. Data on the domestic consumption of Calor gas, which was distributed by major oil companies, were withheld, being considered confidential information.

The economic half of the landscape is incomplete without consideration of the infra-structure of transportation routes. For each parish the length of all paved surfaces was used to determine road density. As a measure of connectivity of the road network the cyclomatic number was calculated, the higher this number, the more complete the network. In determining this number the street patterns of the major towns were ignored.

The rankings of the thirteen economic components are given in Table 3.3. Summation of these rankings again illustrates the advance-

TABLE 3.3 RANKINGS OF ECONOMIC CRITERIA ON PAROCHIAL BASIS

Parish / Variables	Road density miles/sq. miles [1]	Cyclomatic number	Cars, buses, vans, jeeps, land rovers per 1000 persons [2]	Trucks per 1000 persons [2]	Telephones per 1000 persons [2]	Approx. intensity of telephone calls per month/phone [3]	% private dwellings with 4 rooms of total dwellings [4]
St George's	6.98 (1)	26 (1)	69 (1)	5.9 (1)	350 (1)	165 (1)	25.6 (1)
St John's	3.14 (6)	10 (6)	19 (4)	2.5 (5)	58 (5)	109* (2.5)	20.6 (5)
St Mark's	4.19 (5)	5 (5)	15 (6)	2.2 (6)	94 (2)	109* (2.5)	21.0 (4)
St Patrick's	5.42 (3)	19 (3)	18 (5)	2.8 (4)	55 (6)	59 (6)	24.3 (3)
St Andrew's	5.62 (2)	21 (2)	22 (3)	3.1 (3)	65 (4)	105 (4)	18.8 (6)
St David's	4.69 (4)	13 (4)	28 (2)	3.1 (2)	66 (3)	96 (5)	25.2 (2)

LEGEND

G.E.S. = Grenada Electricity Services
$ = Eastern Caribbean Dollars
* = Telephone exchange not separate
- = service not available
(1)-(6) = Rank

SOURCES OF DATA

1. Public Works Dept., St George's
2. Dept. of Finance, Income Tax and Inland Revenue Office, St George's
3. Cable and Wireless Co., St George's
4. 1960 Population Census, Grenada
5. PHO/WHO, A Plan for Water Development in Grenada, St George's, 1968
6. Grenada Electricity Services, St George's

TABLE 3.3

Parish	Variables	% private dwellings with water closet 5	% private dwellings with no toilet facilities 5	Water pipe feet/ person/sq. mile 5	Water rates amount per 100 persons $ E.C. 5	G.E.S. per consumer domestic rate $ 6	G.E.S. per consumer commercial rate $ 6	Sum of Rankings
St George's		35	17	346	5840	115	350	
		(1)	(1)	(1)	(1)	(1)	(1)	Rj=13
St John's		8	32	81	1330	60	174	
		(3)	(3)	(6)	(5)	(5)	(3)	Rj=55.5
St Mark's		3	56	132	1380	-	-	
		(4)	(5)	(5)	(3)	(6)	(6)	Rj=60-5
St Patrick's		2	49	212	1170	84	102	
		(5.5)	(4)	(3)	(6)	(3)	(4)	Rj=54.5
St Andrew's		13	29	242	1350	68	288	
		(2)	(2)	(2)	(4)	(4)	(2)	Rj=38.5
St David's		2	67	151	1610	87	67	
		(5.5)	(6)	(4)	(2)	(2)	(5)	Rj=47.0

ment of St George's parish (Table 3.4). Although it ranked second overall, St Andrew's parish showed a wide dispersion in its individual rankings, as is evident from its coefficient of variance, V = 46. The other parishes all showed more variance than they had for their social components. In rank order, St Patrick's and St John's were separated by only one point. This was the only incidence of clustering, as several points separated the other parishes (Table 3.5).

As there is greater variability in the ranking of the economic components than between the social ones, Kendall's Coefficient of Concordance had a lower value, W = .51, but still gave a significant measure of agreement between the rankings.

TABLE 3.4 ECONOMIC FACTORS

Rank	Sum of ranking	Mean ranking	Standard deviation	Coefficient of variance
Re	Rj	Rj/n	O	V
1 St George's	13.0	1.00	0.00	0
2 St Andrew's	38.5	2.96	1.36	46
3 St David's	47.0	3.62	1.46	40
4 St Patrick's	54.5	4.19	1.25	30
5 St John's	55.5	4.27	1.36	32
6 St Mark's	60.5	4.65	1.43	31

TABLE 3.5 HIERARCHY(H) FROM COMBINING SOCIAL AND ECONOMIC FACTORS

H		Sum of ranking	Mean ranking	Standard deviation	Coefficient of variance
	Rse	Rj	Rj/n	O	V
1	1 St George's	25.0	1.00	0.00	0
2	2 St Andrew's	25.0	3.02	1.10	36
3	(3 St David's	97.5	3.90	1.30	33
	(3 St Patrick's	97.5	3.90	1.29	33
4	(5 St Mark's	116.0	4.54	1.35	30
	(6 St John's	117.5	4.64	1.23	27

Combining the social and economic components

Between the social and economic rank orders a marked similarity exists. In both categories the parishes of St George and St Andrew ranked first and second respectively. The other parishes altered no more than one rank position either up or down. On determining Spearman's Rank Correlation between the two categories, a value of .89 was obtained. This supports the postulate that in Grenada social and economic components are interdependent.

Combination of both sets of components provides some indication of a hierarchy of development in the social-economic landscape. Table 3.5 shows the combined sum of the rankings, their mean rank score, the standard deviation from this score, and the coefficient of variance. The hierarchy which results is essentially four-tiered. At the highest level of development is St George's parish, at the second level St Andrew's, at the third level St David's and St Patrick's, and at the lowest level St John's and St Mark's. St David's and St Patrick's have equal rank totals, while the difference between St John's and St Mark's parishes is so small as to be insignificant. The degree of variance is fairly constant in all parishes, excluding St George's, registering V between 27 and 37. As Kendall's Coefficient of Concordance has a value of .52, the method of obtaining the hierarchy has statistical significance.

Although the method of analysis has of necessity been simple, and the data used for ranking limited in scope, the result is one which ascribes to the opinion of Grenadians questioned on this subject. Of ten educated citizens asked to rank their island's parishes with respect

to social and economic considerations, seven did so in accordance with the rank order of the economic components, two from St Patrick's ranked their parish ahead of St David's, and one resident of St David's considered his parish to be more developed than St Andrew's by virtue of its proximity to St George's. Allowing for parochial prejudice, which is to be expected in such a subjective assessment, there is a high level of agreement between local evaluation of levels of development in the parishes and those found in this study.

Summary

This chapter has examined the social and economic landscape of Grenada's six parishes, and succeeded in identifying a four-tiered hierarchy of levels of development between these parishes. It is against these differing landscapes that small farming is subsequently examined, and an evaluation of their influence upon the nature of agriculture made.

CHAPTER 4

THE QUESTIONNAIRE AND METHOD OF SAMPLING

Prior to the examination and analysis of data concerning small farming, it is relevant to outline the method of surveying, which includes the design of the questionnaire, the sampling technique, and the manner in which the small farmer was interviewed.

The agricultural questionnaire was the principal research tool used in the field, and a copy of it forms Appendix I. As mentioned in the Introduction, the survey concerned a 6 per cent sample of small farmers, i.e., those who worked, or were responsible for land, totalling not less than 1 acre and not more than 15 acres in size, as listed in the 1946 West Indies Agricultural Census. At the time of the field work this was the only census data available, and consequently it was used to determine the sample size for each parish. Due to differences in the size of the parishes and the number of small farms in them, the sample size varied from 10 in St Mark's to 99 in St Andrew's, giving a total of 300. On the advice of a statistician the sample size of St Mark's was arbitrarily raised to 20 in order to give greater validity to any statistical calculations that might subsequently be made. To restore some balance to the total sample size the number for St Andrew's parish was decreased to 85. The effect of these changes in the sample size is

only that a more accurate survey is carried out in St Mark's parish and a slightly less representative one in St Andrew's.

The location of the farms to be sampled was made from the Grenada 1:50,000 map sheet, 1963, revised 1967, which indicates the location of individual buildings in the rural areas. By superimposing a grid upon the map sheet, and by obtaining sets of co-ordinates from a table of random numbers, a randomly selected point on the map was obtained. Where this point coincided with, or was in a quarter-mile radius of, a symbol for a building, then that building represented a possible household for sampling. Where the point fell outside a quarter-mile radius of any building, or within the small built-up areas of the parish towns, it was omitted and another selected. This procedure was continued until the sample size for each parish was satisfied. In the course of field work it was found that many of the buildings selected for sampling no longer existed, were ruins from Hurricane Janet, deserted homes, banana storage sheds, bocans for cocoa or nutmegs, or dwellings where the occupant had less than 1 acre or more than 15 acres or land. In these circumstances, the nearest appropriate dwelling was taken, provided it was less than one-eighth of a mile from the originally selected building. If no appropriate dwelling and applicable landholder was present in the vicinity, then a fresh random point was selected.

The objectives and design of the questionnaire

The aim of the questionnaire was to obtain from each small farmer relevant information about his land, his means of working it, and his social and economic background. It was realized that as much of the

information was of a personal nature it would be difficult to obtain unless the confidence of the farmer could first be gained. The design of the questionnaire therefore became a major consideration. The number of questions was kept to a minimum so that only essential information was elicited.

The format of the questionnaire permitted three advantages to be realized: 1) it maximized the attention given to the respondent and so made the interview as informal as possible; 2) it minimized the writing done in the field by including as many anticipated answers as possible; and 3) it was easy to transcribe data onto 80 column cards for processing by computer. This necessitated having a selection of codifiable, anticipated answers and space for unexpected responses.

To facilitate handling and to avoid arousing additional suspicions to any already aroused by the interview itself, a compact layout incorporating a minimum of pages was used. A blank sheet was provided for field sketches and additional notes.

The questions were structured in a lucid and terse form, and ordered in such a way that they had some cohesion. 'Key' questions were not juxtaposed and, where possible, were preceded by simple 'lead-up' questions. In this way, it was hoped to gain the confidence and respect of the respondent, so that he had little or no reluctance in replying as the interview proceeded. For this reason personal information was solicited towards the end of the questionnaire. Questions to check reliability were incorporated, such that should a respondent reply in the affirmative at one point a corresponding reply would be expected later on, e.g. questions I.2, VI.5, II.4 and II.4i, and questions II.19 and

III.8ii (as it was only possible to receive this subsidy through an extension officer).

So that the interviewer should not be suspected as an under-cover employee of the local Income Tax office, questions requiring monetary values to be stated were renounced. By asking about ownership of material goods, such as household belongings, vehicles, tools, livestock, the size and tenure of land, and through personal observations, some impression of the economic well-being of the household could, nevertheless, be obtained. To have dwelt upon topics relating directly to income or expenditure in a society where the taxable income has a threshold of $1,000, and where many families receive remittances from overseas, would have invited unreliable answers.

The questionnaire in the field

A major drawback of this survey was the impracticability of conducting any pilot survey of the questionnaire. To compensate for this omission, the questionnaire was examined by a number of people in various disciplines who had experience with questionnaires. As a result of their many suggestions the draft questionnaire underwent several revisions before an acceptable form was devised. Even in this form it was recognized as having potential shortcomings which could only be realized after field experience.

After conducting ten interviews in Grenada, it was apparent that some modifications and additions were necessary. In the light of discussions with local agricultural officials, amendments were made. Some were to accommodate local vernacular, such as 'fowls' instead

of 'chickens', and incorrect terminology, such as agricultural extension 'instructors' instead of 'workers'. The question, 'How many years of schooling have you received?', proved meaningless, as someone who had attended school sporadically for several years might have gained little in terms of academic achievement. As the purpose of the question was to obtain an indication of the farmer's educational attainment, it was changed to, 'What standard did you reach at school?' Some of the chemical names of fertilizers proved inappropriate, as locally they are referred to by the ratio of their composition of nitrogen, phosphorus, and potassium, e.g. 12-8-24, 11-11-33, and these were incorporated.

Another fact which became apparent in these initial interviews was that certain aspects of the farmer's economic well-being were neglected in the questions as they stood. These included the number of children abroad who could conceivably send remittances, and whether or not the farmer had himself worked overseas. Such facts could account for a prosperity which might not be evident from the contemporary daily work on the land. These shortcomings in the questionnaire were corrected by adding appropriate questions. With these amendments and additions as a result of the initial ten interviews, the questionnaire was used in the field for the whole of the remaining sample.

Where feasible the survey was conducted at or near the home of the smallholder. This permitted a means of standardizing the interview and allowed inspection of the house and the immediate property, so that the respondent had less chance of being deceptive.

As the survey was undertaken with the full co-operation of the Grenadian Department of Agriculture, it was through their extension

instructors and plant protection officers that transportation throughout the island was arranged. Sometimes they would be present during the course of the interview and could be most helpful in dealing with any difficulties of comprehension of the questions by the respondents. They were also useful in supplying information about their local district.

The survey began on 16th January 1969, and was completed almost six months later, on 3rd June. This time coincided with the island's dry season, so that transportation to all parts of the island was not unduly hindered by inclement weather, as it would have been during the wet season. Differences in the date of interview may have influenced the nature of replies, such as those related to the number of livestock, or the perception of agricultural problems. In an attempt to overcome this possible source of inconsistency, each parish was visited on several occasions during the six months, but unfortunately it was not possible to make regular visits.

Each questionnaire took an average of 50 minutes to complete, with none taking less than 30 minutes or more than 90. A maximum of 9 was completed in a single day, however, the daily average was 4. The number achieved in any one day depended upon the accessibility of the house, the distance from the site of the previous interview, and the time taken in locating the head of the household to whom the questions were directed.

The majority of the small farmers were co-operative and patient in supplying the answers. In only one instance was there an outright refusal, this was by a woman in St David's who would not answer in

the absence of her husband, who was overseas. It was the less educated respondents who were the most suspicious. Invariably such people were poor, and were understandably reluctant, and sometimes deceptive, in answering questions which would expose their poverty. Others tried to impress by exaggerating their hardships and shortcomings in anticipation that this researcher might ameliorate their plight. Those who comprehended the nature of the survey were anxious to help and gave every assistance. A summary of the attitudes of the respondents is given in Table 4.1.

TABLE 4.1 ATTITUDE OF RESPONDENTS TO QUESTIONNAIRE

	Percentages		
Parish	Deceptive	Reluctant	Obliging
St George's	11	22	67
St John's	14	14	72
St Mark's	5	29	66
St Patrick's	8	33	59
St Andrew's	7	28	65
St David's	6	25	69
Total	9	25	66

Only two questionnaires, one in St Patrick's and the other in St Andrew's, were found to be sufficiently inconsistent to warrant discarding them. The number of acceptable questionnaires was 292, of which St George's provided 52, St John's 38, St Mark's 21, St Patrick's 46, St Andrew's 86 and St David's 49. In obtaining this number a total of 461 randomly selected sites were visited, 169 being rejected for various reasons.

Conclusion

A survey is only as good as its questionnaire, and while this questionnaire has included many of the factors cited as influencing small farming, it cannot be assumed that all have been covered. It can but be hoped that there are not serious oversights or inherent shortcomings in either the questionnaire or the sampling method. However, the internal consistency of responses, the fact that their evidence supports the impressions gained during the period of field work and the opinions of senior members of the Grenadian Department of Agriculture, and the agreement that the findings have with the major criticisms and comments made in the literature on West Indian agriculture, suggest that the survey is reasonably representative of small farmers.

As for the reliability of the questionnaire's findings, there was no satisfactory method of checking all the replies, so that much reliance is placed on human integrity and the standardization of technique. It was hoped that if the majority of the respondents gained some appreciation of the aim and purpose of the research, then they would realize they had nothing to lose, and possibly something to gain ultimately, by the honesty of their replies. The greater this honesty, the more authentic becomes the picture of their way of life, its problems and needs, and the more constructive and meaningful the final analysis.

CHAPTER 5

SMALL FARMERS

This chapter introduces the sampled small farmers by providing a description and analysis of their life history, acquisition of farming knowledge, household and association with religious and racial groups where these influence attitudes to work. In the process of developing these themes, a set of social and economic norms is presented, and it is against these norms that subsequent analysis is made of the various categories of small farmers.

Life history

Childhood

Almost all small farmers were born of parents who themselves were active in agriculture. In fact their way of life is virtually the same as that of their parents, in that they live in crude wooden shacks, cook over a charcoal fire, carry water in buckets from a stream or roadside tap and go barefoot along muddy tracks to collect fruit and vegetables from their garden plot. Many of them can be classified as peasants, since their principal concern is 'the satisfaction of the yearly consumption budget of the family'.[1] This results in land not being operated as an economic unit.

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1. A.V. Chaianov, 'The Socio-economic Nature of Peasant Farm Economy', in P.A. Sarakin (ed.), A Systematic Source Book in Rural Sociology, University of Minnesota Press, 1931, p.145.

During their childhood, farmers assisted their parents on the land, and around the home, as soon as they could perform light chores. By the time boys were fifteen years old, they would be familiar with most farming activities. Girls of the same age usually had less experience working land as their time was occupied with household duties. Between the ages of 6 and 14 years, children were expected to attend a government primary school, although their attendance was often sporadic. This irregular attendance was a reflection of the financial situation of the household, the value attached to education by the parents and the distance of the school from the home. In fact, there was, and still is, a weekly cycle in the roll call at Grenadian primary schools which limits the effectiveness of the educational system. Monday has traditionally been wash-day and this has meant a day away from school for those children with only one set of school clothes. With the development of the banana industry and the establishment of Monday as the cutting day for this crop (Tuesday is shipping day) a few children from the major banana producing areas assist their parents with this task rather than attend school. By mid-week attendance reaches a peak, but it begins to decline by Thursday and drops off abruptly on Friday when families gather food crops in preparation for sale on the week's principal market day, Saturday. This weekly cycle is shown in Table 5.1 for a typical rural school and is indicative of one that would have existed when the small farmers attended primary school. The percentage attendance is shown for two periods of a fortnight each, one during the wet season, the other during the dry, together with the amount of rainfall on these days. The effect of inclement weather upon attendance is

TABLE 5.1 WEEKLY CYCLE IN ATTENDANCE AT TIVOLI PRIMARY SCHOOL, ST ANDREWS

	Wet season									
	M Oct. 21	T Oct. 22	W Oct. 23	T Oct. 24	F Oct. 25	M Oct. 28	T Oct. 29	W Oct. 30	T Oct. 31	F Nov. 1
% Attendance	80	83	81	78	46	71	40	73	70	41
Rainfall (inches)	-	-	-	-	.50	.24	.31	.33	.24	-

	Dry season									
	M Feb. 10	T Feb. 11	W Feb. 12	T Feb. 13	F Feb. 14	M Feb. 15	T Feb. 16	W Feb. 17	T Feb. 18	F Feb. 19
% Attendance	74	83	78	68	37	76	84	80	73	44
Rainfall (inches)	-	-	-	-	-	-	-	-	-	-

Source: Rainfall data from Tivoli Agricultural Station and School Records

apparent from the associated rainfall data, although a direct correlalation is not always evident as the time of rainfall was not recorded and this would have been critical in determining whether or not a child attended.

Instruction at primary schools was generally unrelated to the rural economy and way of life. Students, therefore, received little or no tuition in rural science or in subjects of a practical nature. The educational system, a vestige of British Colonial policy, was geared for training a minority of students for clerical jobs, while little attempt was made to give the remainder a meaningful education. From these primary schools, the highest attainment was a leaving certificate awarded after the successful completion of the seventh standard. Since

the first year at school was pre-primary, a student was fourteen years old by the time he completed the seventh standard. For most small farmers formal education ended at whatever standard they had on leaving, or dropping-out from, primary school. Only 14 small farmers, or 4.8 per cent of the sample, had attended secondary school and did so either as recipients of scholarships, or because they had the required academic standing and parents who could afford to pay the fees.

The mean level of educational attainment of the small farmers is between the fourth and fifth standards, or about equivalent to an average ten year old in Great Britain (Table 5.2). Forty farmers, 14 per cent of the sample, had not reached the first standard and are illiterate. The mean standard of educational attainment showed variation between the parishes, the importance of which becomes evident in later chapters.

TABLE 5.2 EDUCATIONAL ATTAINMENT OF SAMPLED FARMERS

Parish	Mean educational standard	Number of those not reaching 1st standard
St George's	4.32	6 (12)*
St John's	3.31	11 (29)
St Mark's	4.05	2 (10)
St Patrick's	4.12	5 (11)
St Andrew's	4.26	14 (16)
St David's	5.44	2 (4)
Sample total	4.31	40 (14)

* Percentage of total in brackets

Occupational experience and employment overseas

Although formal education of most farmers ended when they left school, some furthered their training through an informal apprenticeship to become carpenters, masons or tailors. As skilled labourers they ply their trade on a regular basis at first, devoting less time to it as they acquire more land. This is because ownership of a self-supporting farm and sufficient prosperity to permit employment of a labourer are definite ends in life.[2] Other farmers had had similar ends in mind when they went abroad, anticipating to accrue capital more readily in countries where opportunities for work were more plentiful and wages higher than in Grenada. During the present century such opportunities have been numerous. Prior to the First World War, construction work on the Panama Canal provided two of the farmers with the means to purchase a house and a few acres of land. In the 1920s and 1930s some Grenadians went to work as unskilled and skilled labourers for oil companies, which had established in Venezuela, Trinidad and on the Dutch Islands of Aruba and Curacao. Throughout the period 1900 to 1940, some agricultural workers migrated as seasonal labour to plantations and estates in British Guiana (now Guyana), British Honduras, Cuba, Santo-Domingo and Haiti. With the establishment of a United States Armed Forces base at Chaguaramas, Trinidad, during the Second World War, another opportunity arose for working abroad at attractive wages. Since 1945 movement to Trinidad has continued with a small proportion of migrants returning after the appeal, financial or otherwise, has lost its hold. More recently the United Kingdom has been attractive to immigrants,

2. Smith and Kruijer, Op. cit., p. 40.

although the Commonwealth Immigration Act of 1962 drastically reduced this flow of people (Table 5.3)

TABLE 5.3 GRENADIAN IMMIGRATION TO THE UNITED KINGDOM

Year	No. of persons
1955	50
1956	880
1957	965
1958	1,000
1959	365
1960	2,502
1961	2,200
*1962	1,052
1963	395

* United Kingdom Commonwealth Immigration Act came into effect on 1st July 1962.

Source: Registrar General's Office, St George's

More than one-third, 37 per cent, of the sampled farmers have, at one time or another, been employed outside of Grenada. The reason most commonly expressed for taking such employment was that at the time it represented the best opportunity of saving quickly to become independent farmers. Table 5.4 shows the number of farmers with this experience abroad by place, or places, of employment. Several of them had worked in more than one region. Trinidad, by reason of its proximity and favourable immigration regulations, has clearly been the most common place of foreign employment.

Apart from providing a source of capital, experience of working abroad has served another valuable service, that of eliminating the dominant peasant mentality. This applies to those who have worked in areas which are economically more developed than Grenada, notably the

TABLE 5.4 THE NUMBER OF SAMPLED SMALL FARMERS WHO HAVE WORKED ABROAD BY PLACE OF EMPLOYMENT

Parish	Sample size	United Kingdom	North America	Aruba, Curacao	Trinidad	Latin America	Other West Indian islands	Total worked abroad	Percentage worked abroad
St George's	52	2	1	2	11	4	3	18	35
St John's	38	2	1	2	9	6	2	17	45
St Mark's	21	3	2	3	2	2	-	8	38
St Patrick's	46	2	1	1	8	2	3	14	30
St Andrew's	86	4	3	4	20	3	4	32	37
St David's	49	1	3	4	21	4	1	20	41
Total	292	14	11	16	71	21	13	109	37

United Kingdom, North America, Trinidad, Aruba and Curacao. In such places the labourer experienced higher levels of living than those to which he accustomed and invariably this served to whet his appetite for material gain and well-being. In order to satisfy these desires, he becomes economically motivated, with the result that his attitude to land is not confined to supplying the consumptive needs of his family, but to making it an economic enterprise.

Farmers who did not go overseas acquired their land either through inheritance or from savings accrued from local employment in which some are still engaged. There are 114 sampled farmers, or 39 per cent, in paid employment, and who derive more than half their income from a source other than their land. They are, therefore, part-time farmers, and this is frequently an unsatisfactory arrangement for

successful farming, since time and interest are divided between their place of work and their crops, usually to the detriment of the latter. Of these part-time farmers, 83 are employed as estate workers, unskilled labourers and skilled labourers (Table 5.5) with the ultimate aim of acquiring sufficient land to become independent farmers.

> There is a deeply ingrained suspicion that jobs, however well paid, are insecurely held and this feeling of insecurity grows with the increasing pressure of population on available jobs.[3]

They believe their only real and permanent security to be ownership of land.[4] For those who work as estate workers or as unskilled labourers

TABLE 5.5 OCCUPATIONS OF SAMPLED PART-TIME FARMERS

Parish	Number of farmers	Estate worker	Unskilled labourer	Skilled labourer	Fisherman	Service industry	Civil service	Professional	Percentage part-time farmers of total	Not applicable*
St George's	52	5	9	2	-	4	3	-	44	4
St John's	38	7	3	-	-	1	-	1	32	2
St Mark's	21	5	-	1	-	1	-	-	31	2
St Patrick's	46	9	1	4	2	1	-	-	37	6
St Andrew's	86	18	2	6	1	3	-	2	37	8
St David's	49	3	5	3	-	5	6	1	47	2
Total	292	47	20	16	3	15	9	4	39	24
% of sample	100	16	7	5	1	5	3	1		8

* Those who do not work their land as they are infirm, pensioned, or receive income from private sources

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3. E. Clark, My Mother Who Fathered Me, London, 1957, p.65.

4. Loc. cit.

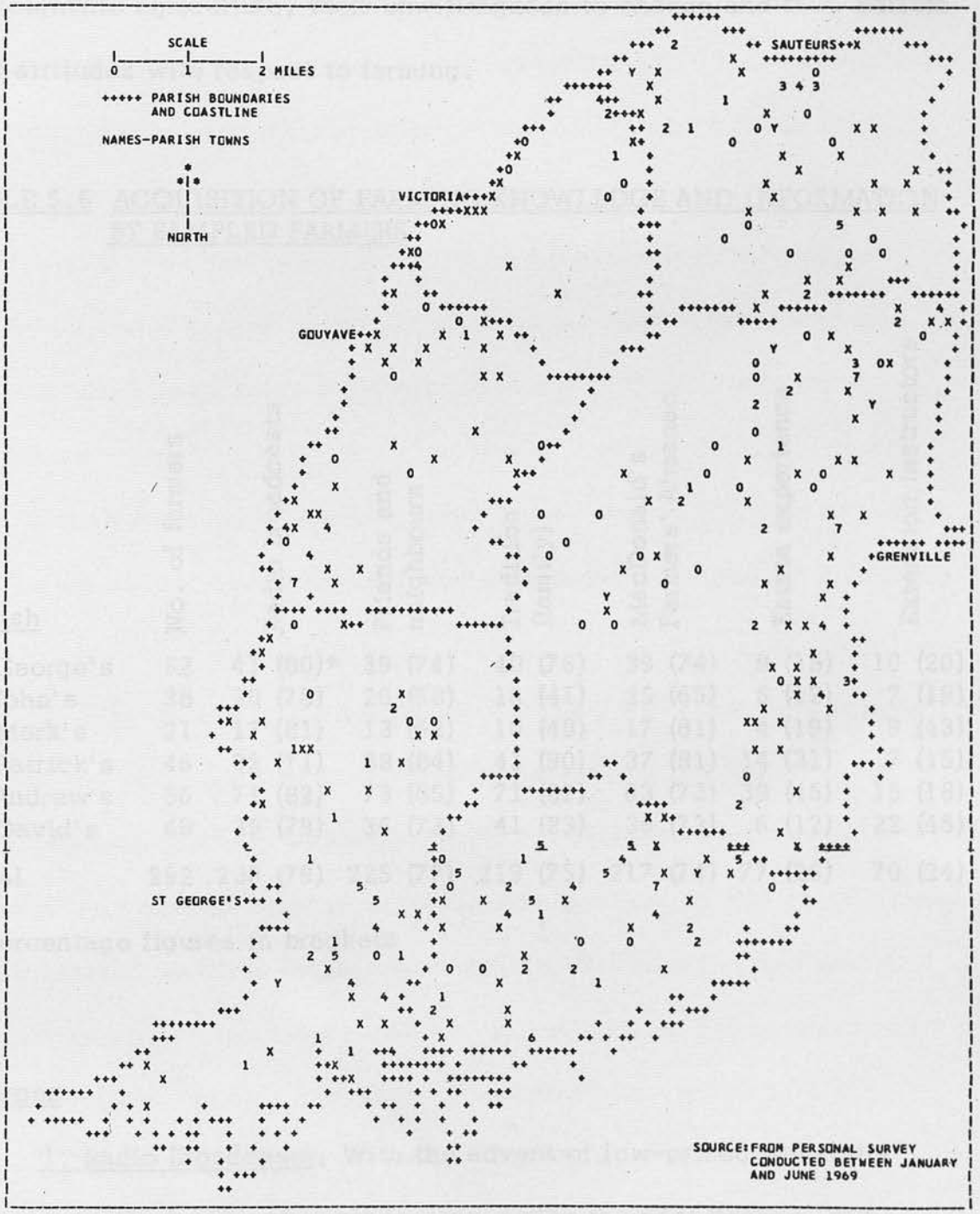
it is usually not until they are over fifty years of age that savings from their meagre income are adequate to purchase sufficient land for them to become full-time farmers. Skilled labourers, such as carpenters, masons, tailors and electricians, receive higher wages and therefore can become independent farmers at the earlier age of forty. Those employed in service industries (mainly small shopkeepers and truckers with their own vehicle), the civil service and the professions, are less concerned with becoming full-time farmers, because their positions are of higher social status than the average small farmer, and because they consider themselves to have security in their jobs without needing to revert to agriculture. All three sampled fishermen have ambivalent attitudes to farming, as they regard work on the soil as degrading, but realize that, since life at sea is unpredictable, they require land to be assured of satisfying the needs and security of their family.

Of the remaining farmers, 154, or 53 per cent, are principally engaged working their land, while 24, or 8 per cent, take no active physical part in farming, because they are infirm, pensioned or have a private income, and either leave the cultivation of their land in the hands of relatives and hired labourers, or abandon it. Computer Map 1 shows the distribution of farmers by occupational groups.

Acquisition of farming knowledge

Despite the diversity in educational and occupational background, small farmers recognise similar sources of farming knowledge and information. Most of them acknowledge four sources: radio broadcasts, friends and neighbours, traditional beliefs and MacDonald's Farmers'

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
OCCUPATION



LEGEND
0 ESTATE WORKER
1 UNSKILLED LABOURER
2 SKILLED LABOURER
3 FISHERMAN
4 MEMBER OF SERVICE INDUSTRY
5 CIVIL SERVANT
6 BUSINESS MAN
7 MEMBER OF PROFESSION
X WORKS ON OWN FARM
Y DOES NOT WORK

COMPUTER MAP 1

Almanac (Table 5.6). Two additional sources are estate experience and extension instructors. The emphasis of this acquisition is of an informal nature, thereby corroborating Edwards' findings in Jamaica.[5] These sources of farming knowledge explain in part, the farmers' lack of scientific agriculture, their unwillingness to change and their beliefs and attitudes with respect to farming.

TABLE 5.6 ACQUISITION OF FARMING KNOWLEDGE AND INFORMATION BY SAMPLED FARMERS

Parish	No. of farmers	Radio broadcasts	Friends and neighbours	Tradition (family)	MacDonald's Farmers' Almanac	Estate experience	Extension instructors
St George's	52	41 (80)*	39 (74)	40 (76)	39 (74)	9 (18)	10 (20)
St John's	38	30 (78)	26 (68)	16 (41)	25 (65)	5 (12)	7 (19)
St Mark's	21	17 (81)	13 (62)	10 (48)	17 (81)	4 (19)	9 (43)
St Patrick's	46	32 (71)	38 (84)	41 (90)	37 (81)	14 (31)	7 (15)
St Andrew's	86	71 (82)	73 (85)	71 (82)	63 (73)	39 (45)	15 (18)
St David's	49	39 (79)	36 (73)	41 (83)	36 (73)	6 (12)	22 (45)
Total	292	230 (79)	225 (77)	219 (75)	217 (74)	77 (26)	70 (24)

* Percentage figures in brackets

Sources

1. Radio Broadcasts: With the advent of low-priced transistor radios into the homes of small farmers during the past decade, radio broadcasts have become the most widely indicated source of farming

5. Edwards, op. cit., p.79.

knowledge and information. This does not imply that it is either the most influential or important source. With more than three-quarters of the sampled households possessing a receiving set, 79 per cent of the small farmers regularly listen to radio programmes presented by the extension division of the local Department of Agriculture, and broadcast over the Windward Islands Broadcasting System. These broadcasts consist mainly of a weekly bulletin of farm news, which gives details of crop production, times of shipping, prices, weather, exhibitions, and farmers' club meetings. Occasionally these programmes contain advice on techniques of cultivation and marketing. Through this medium the extension service can regularly reach the most isolated parts of the island.

Farmers not acknowledging radio broadcasts as a source of information are mainly estate workers who neither have a radio nor access to one.

2. Friends and neighbours: Small farmers will often turn to their friends and neighbours when advice and assistance are required. At such times as disease, pests or erosion are problems, a friend or neighbour, whose knowledge is respected, is asked for his suggestions. Occasionally, when a farmer breaks with tradition and successfully introduces a new crop, tool or method of cultivation, his neighbour may ask for details. Should any attempt at improvement result in failure, then a discreet silence ensues, with faith in the traditional crop, method or tool being reinforced.

3. Tradition: Traditional farming knowledge is considered to be that learnt from parents and guardians. In this way many of the

characteristic features of small farming have been passed down through succeeding generations. Consequently it is the most important and influential source of farming knowledge. For most small farmers, it was an inevitable process of assimilation of knowledge, which began in childhood when they first watched, and later, when old enough, helped their parents with various jobs on the land. The process ended when they had learnt all that their parents knew. As a rule the knowledge of their parents is accepted without question and adhered to for reasons of respect and sentiment. This creates a deeply engrained attitude of conservatism among the farmers, so that all change is viewed with scepticism and caution. Therefore some farming practices are followed for non-economic reasons and are out-dated, unscientific, inefficient and impractical. For example, in the provision grounds of small farmers an arrangement of crops frequently seen is one where the least valuable, such as pigeon peas, surround the periphery of the plot, while those of greater market value, such as tomatoes or melons, are in the middle where they are partly concealed and less accessible. This type of organization of crops was developed during the days of slavery when praedial larceny of crops was a common occurrence. When questioned about this arrangement of crops the farmers replied that their fathers had taught them this way and they believed it to give better results; the original reason had escaped them.

4. MacDonald's Farmers' Almanac: Throughout the island small farmers display immense trust in MacDonald's Farmers' Almanac, an annual astrological publication printed in the United States. As a guide for planting and cultivating crops it was consulted by 73 per cent of the

sample (Table 5.6) in the twelve months prior to their interview. The popularity of this publication stems from its appeal to the traditional and superstitious nature of the people. It considers the lunar cycle as a factor in farming practices, and thereby complies with African tribal beliefs, some of which are still in evidence in West Indian folklore.[6] A commonly noted example of the moon's influence is in the planting of crops: when the moon is 'coming-up' (waxing) it is believed that only crops which produce above the ground, such as cabbages and tomatoes, should be planted, while with 'going-down' (waning) of the moon, only crops which produce below the ground, such as potatoes and dasheen, should be planted. Three days before and after full-moon no crops should be planted. In addition to planting, other farming activities such as pruning, weeding, fertilizing and harvesting, are considered to be most effectively performed when done in conjunction with this cycle.[7] Those who followed the lunar cycle did so irrespective of their level of education or experience abroad. Those who ignored it, did so either because they could not be bothered to understand it, or because their personal experience disproved it.[8] It is generally felt

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6. Clark, op. cit., p.18.

7. Conversation on this subject with agricultural extension instructors showed that their initial reaction was to disregard the moon phase as unscientific and therefore of no merit to agriculture. Further discussion often indicated that their personal experience suggested otherwise and that some at least were in sympathy with it.

8. Experiments have been conducted at the University of the West Indies, St Augustine, into the effects of planting, pruning, fertilizing, etc. by the lunar cycle. For vegetables and ground provisions no substantial results have been found. However, it was shown that the popular belief that bamboo cut at full moon will last only a short time, is correct. This is the result of certain insects mating in bamboo at full-moon and their larvae subsequently feeding on the bamboo stem, thus weakening it.

best to abide by the Almanac where possible, as one '"takes a chance" if planting is not carried out in accordance with its recommendations'.[9]

5. Experience on an estate: Although only 16 per cent of the sample are employed on estates, 29 per cent considered their experience on estates to have contributed to their farming knowledge, indicating that in the past other farmers had been estate workers. Knowledge gained from estate work could be of a more specialized nature than that obtained from parents, as the workers would gain familiarity with the commercial production of export crops and with scientific methods of farming, such as spraying for protection against insect and fungus damage, regulating the distribution and type of fertilizer and marketing and grading of produce. The extent and nature of this knowledge would vary according to the position the farmer held on the estate, his length of service there, his understanding and appreciation of the operation and the crop specialization of the estate. It is on the basis of this experience that the more enterprising estate workers establish themselves as independent farmers specializing in export crops.

6. Extension instructors: The most formal source of farming knowledge is the extension instructor. He is, however, the least recognized, being acknowledged by only 23 per cent of the sampled small farmers (Table 5.6). This figure is low, especially since 58 per cent of the farmers stated that, in the two years prior to their interview, they had had contact with an extension instructor. The failure to identify the instructor as a source of farming knowledge stems from many farmers being ignorant of the extension service and regarding the

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9. Edwards, op. cit., p.88.

instructor as 'dat man who giv de seed away' or 'de fella who lined me contour drains'. They did not realize that he could advise them on eradication of fungus growth, castration of livestock or marketing of produce. With one instructor for every 700 farmers in Grenada, it is generally the farmer with the larger, and economically more important, holding who receives regular assistance and guidance from the instructor.[10]

6. Other sources: Less than 10 per cent of the farmers cited other sources of farming knowledge. These included the farmers' own experience on the land, The Farmer's Guide (a publication of the Jamaica Agricultural Society),[11] and the transfer of knowledge their children had acquired at school. No farmer credited his own primary schooling with having benefited his knowledge of agriculture. Three farmers have received formal instruction in agriculture at either the Eastern Caribbean Farm Institute at Centeno, Trinidad, or the Imperial College of Tropical Agriculture at St Augustine, Trinidad; two of them are employees of the Department of Agriculture, while the other is a retired estate manager.

Sources of farming knowledge are mainly informal and consequently tend to perpetuate the established practices of small farmers. Thus, change and improvement of farming methods is difficult and can only be achieved gradually.

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10. W. Bain, 'Sources of Agricultural Information used by Farmers on the Island of Grenada, West Indies', unpublished M.Sc. thesis, Michigan State University, 1968, p.35.

11. Jamaica Agricultural Society, The Farmer's Guide, Glasgow, 1962.

Character of the household

As the life history of the farmer influences the nature of farming, so too does the character of his or her household. The sex, age and marital status of the head of the household and the size of the household, are factors which help to explain and understand his or her farming system.

The household consists of those people living in the house selected for study. Its members need not be identified with the family, as 'sometimes the household does consist of mother, father and own children only, but more often it contains a collection of people tied by kinship.'[12] When the survey was being conducted the questionnaire was directed to the head of the household, irrespective of whether he held title to the property or not. For example, in cases of marriage and cohabitation, title frequently remains in the woman's name although the man assumes responsibility for the property. In such circumstances the man is considered to head the household.

Households are dominated by male headships, although in 55, or 19 per cent, of them women held this position (Table 5.7). Of these, 24 assumed control on the death of their spouse, 20 were spinsters, 4 were separated and 7 were married. Of the latter, 4 had husbands who were sailors or fishermen and away from home for long periods, two had husbands studying in Great Britain, and one a husband so severely handicapped by an accident that he was incapable of physical action or mental decision. Of the parishes, St Patrick's is distinguished

12. M. Kerr, Personality and Conflict in Jamaica, Liverpool, 1952, p.61.

TABLE 5.7 SEX OF HEADSHIPS IN SAMPLED HOUSEHOLDS

	No. in sample	No. of females	No. of males
St George's	52	43 (83)	9 (17)*
St John's	38	28 (74)	10 (26)
St Mark's	21	19 (90)	2 (10)
St Patrick's	46	30 (65)	16 (35)
St Andrew's	86	72 (84)	14 (16)
St David's	49	41 (84)	8 (16)
Total	292	237 (81)	55 (19)

* Percentage figures in brackets.

from the others by having almost one-third of its households headed by women (Table 5.7). This reflects the high ratio of females to males, 123.5 to 100, in a parish where men migrate in search of work (supra, p. 48) and less frequently enter into stable relationships with their women. As heads of households, women are not greatly interested in working their land, as they believe their domestic responsibilities are more important. Consequently, they neither have the time nor the energy to work their land as a commercial enterprise, and so usually have only a minimum of land under cultivation.

The farmer's age is an important aspect of the character of the household, as it denotes to some degree whether it is youthful and progressive, or old and staid. In turn this is reflected in his attitude to farming, whereby if he is young, he can be ambitious and eager to expand his farming operation, but if old, tends to be more concerned about his health and survival than his land. As the mean age of the sampled farmers is 53.9 years (Table 5.8) most of them are in the twilight of their active working life, and so have a limited interest in

increasing their production, a reluctance to change their method of farming and a generally conservative outlook on agriculture. These are characteristics which handicap progress amongst small farmers.

TABLE 5.8 MEAN AGE OF SAMPLED FARMERS

Parish	Mean age in years
St George's	55.6
St John's	54.8
St Mark's	53.0
St Patrick's	52.9
St Andrew's	53.6
St David's	53.2
Total	53.9

Marital status is an index of social stability and responsibility. The adage that behind every successful man there is a good wife, applies to West Indian farming, where the aspiring farmer desires,

> ... a stable union with a capable woman who will not only care for the children and himself, but who will look after his property when he is away and help with the farm work including ... the marketing of the farm produce.[13]

Therefore, the effectiveness of the household as a farming unit can be a reflection of the marital status of the head of the household. Those who are single and have no legal responsibilities to other persons often adopt a carefree approach to their activities, while those who are, or have been, married are more serious. Two-thirds of the sample indicated that they were married (Table 5.9), but this figure is suspected of being high, as no attempt was made to distinguish between couples who were married and those who were living together. For the purpose of

13. Edwards, op. cit., p.70.

TABLE 5.9 MARITAL STATUS OF SAMPLED FARMERS

Parish	Number of farmers	Marital status			
		Single	Married	Widowed	Divorced or separated
St George's	52	12 (23)	26 (50)	8 (15)	6 (12)*
St John's	38	5 (13)	27 (71)	6 (16)	-
St Mark's	21	4 (19)	15 (71)	2 (10)	-
St Patrick's	46	12 (26)	26 (57)	8 (17)	-
St Andrew's	86	8 (9)	65 (76)	8 (9)	5 (6)
St David's	49	9 (18)	36 (73)	2 (4)	2 (4)
Total	292	50 (17)	195 (67)	34 (12)	13 (4)

* Percentage figures in brackets

this study the difference is unimportant, for if a man admitted to having a wife, whether or not the law recognised her as such, it implied that he had a stable union of some standing in time and this had economic implications.

The size of the household is an indication of the social and economic responsibilities of the farmer. In addition it represents a possible source of labour. The average number of persons per household was 5.66, a figure similar to that in Edwards' sample in Jamaica where the average size 'was almost six'[14] and Horowitz's study in Morne-Paysan, Martinique of 5.26,[15] and would appear to be representative of the size of rural West Indian households (Table 5.10).

14. Ibid., p.73.

TABLE 5.10 MEAN SIZE AND COMPOSITION OF SAMPLED HOUSEHOLDS

Parish	Head of household and possible partner	Mean number of other persons			Mean size of household
		Under 5 yrs	5-15 yrs	Over 15 yrs	
St George's	1.55	.72	1.72	1.42	5.41
St John's	1.63	.55	1.52	1.08	4.78
St Mark's	1.72	.57	2.34	1.52	6.15
St Patrick's	1.58	1.04	2.56	1.10	6.28
St Andrew's	1.74	.67	2.11	.99	5.51
St David's	1.71	.71	2.35	1.20	5.97
Total	1.68	.73	2.10	1.20	5.66

Children between the ages of 5 and 15 years can contribute to the family's labour forces by helping with the planting, weeding and reaping. Members of the household who are over 15 years cannot always be counted on to contribute to domestic and farm work, for some are still at school and consider it beneath their dignity to soil their hands, while others are employed elsewhere and only sleep at home. A few members of the household are old and less fortunate relatives who, in return for food and shelter, assist in caring for the children and the home.

The size of the household will not represent the size of the family, as other members have left home. Data from the Assistant Registrar General for the island indicated that the average small farmer's family would have at least two children no longer living at home. Thus, the average family has five or six children. The reason often heard for having such large families was that the more children one had, the greater the probability that one or more would offer their

15. M. Horowitz, Morne-Paysan, Peasant Village in Martinique, New York, 1967, p.41.

parents support in old age. In the case of children who have emigrated, this could be an important source of income, as many send remittances for the welfare and maintenance of their parents, brothers and sisters. As the nature and value of these remittances are difficult to estimate, no attempt was made in this survey to elicit such personal information. At least some of those handicapped by old age, rely on remittances for their income and as a substitute for a welfare scheme. Thus, the number of children who are overseas represents a potential source of revenue which, if ignored, would leave unexplained the economic conditions of some small farmers. Table 5.11 shows that each household has an average of 1.27 persons overseas, and that of these the highest proportion is in the United Kingdom and Trinidad. There is no relationship between the places of overseas employment for the head of the household (Table 5.9) and the place of their child's employment (Table 5.10).

TABLE 5.11 AVERAGE NUMBER OF CHILDREN PER SAMPLED HOUSEHOLD WORKING OVERSEAS

Parish	United Kingdom	North America	Trinidad	Other	Total/household
St George's	.69	.30	.48	.31	1.78
St John's	.56	.05	.19	-	0.79
St Mark's	.62	.43	.19	-	1.24
St Patrick's	.60	.15	.54	.19	1.48
St Andrew's	.57	.23	.42	.06	1.28
St David's	.40	.27	.29	.04	1.00
Total	.56	.22	.38	.11	1.27

Levels of living

The description of the small farmer is incomplete without mention of his economic well-being or level of living. This is done by first considering the distribution of selected goods and utilities present for each household, and by then determining the index of occurrence of these goods and utilities for the sample. Table 5.12 shows the list of items considered and the resulting indices of occurrence for the parishes and the total sample. The most ubiquitous item found in the home is the radio, usually an inexpensive transistor model. The only other item found in more than half the homes is an oil or gas stove (Table 5.12), although 44 per cent of the households have piped-water, the principal utility.

TABLE 5.12 LEVELS OF LIVING OF SAMPLED SMALL FARMERS AS INDICATED BY POSSESSION OF CONVENIENCES AND GOODS

		Conveniences and goods								
Parish	Sample size	Electricity	Sewerage	Plumbing	Gas stove	Refrigerator*	Radio	Telephone	Motor vehicle	Index of occurrence
St George's	52	19	13	28	34	19	43	7	9	.41
St John's	38	10	6	12	13	7	30	1	6	.28
St Mark's	21	6	6	12	11	6	16	1	9	.40
St Patrick's	46	5	4	16	21	7	31	1	3	.24
St Andrew's	86	11	18	38	47	18	69	3	7	.31
St David's	49	16	8	23	36	11	44	2	11	.38
Total	292	67	55	129	162	68	233	15	45	.32
Percentage of total	100	22	19	44	55	22	80	5	15	

* Some refrigerators were powered by gasoline motors

Considerable differences do exist in levels of living between the parishes, and this is indicated by the indices of occurrence for selected items, which range from .41 in St George's parish to .24 in St Patrick's (Table 5.12). Upon ranking these indices, the following order of levels of living, from highest to lowest, is obtained:

1 St George's
2 St Mark's
3 St David's
4 St Andrew's
5 St John's
6 St Patrick's

A comparison between this ranking and that obtained for the social-economic landscape (Table 3.5) reveals no correlation as indicated by Spearman's Rank Correlation, -.36. This lack of correlation on a parish basis between the levels of living and the social-economic hierarchy, shows that the sample of small farmers in each parish is not representative of the total population in that parish. If it had been, then the levels of living of the sampled small farmers in the parish would have mirrored the social-economic landscape.

Religion

The attainment of material success, as manifest in a level of living, need not be accomplished solely on the basis of an individual's ability, but reflects his set of values and the means by which he can rationalize success. In this regard, one's religious beliefs are important, as religion not only provides a cadre for social action, but plays 'an essential role in controlling, limiting and guiding economic behaviour'.[16] Weber has shown, in his writings on the sociology of

16. R.D. Knudten, ed., The Sociology of Religion, an Anthology, New York, 1967, p.333.

religion, that each of the major religions of the world 'developed its own distinctive orientation toward all aspects of social life',[17] and that these differences have been significant in the development of human societies within the Christian religion. Similar effects are noted between the various churches, as each has established its own peculiar attitudes and value judgments. Outlook, needs, responses and the motivational structure of a people are conditioned by the beliefs of their faith.[18] For example, a distinction exists between the Roman Catholics and the Protestants, where the

> Roman Catholic Church tends to orient its members towards the after life; successful performance in the market place and the acquisition of the symbols of economic achievement are of relatively little importance as an indication of the Catholic's status after death ... adherents of Protestantism are assumed to be highly concerned with worldly success and the attainment of material possessions, status, and the prestige that is associated with upward social mobility. These things often are viewed as indications that salvation is assumed or at least is more probable.[19]

Studies in the United States have shown that such religious orientations to life are reflected in behaviour, and that Protestants manifest worldly success to a greater extent than Catholics.[20] Among Grenadian small farmers also this premise is substantiated.

In Grenada, the Roman Catholic and Anglican churches dominate as a result of history (supra, p.4). Three-quarters of the population

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17. G. Lenski, 'Religious Impact on Secular Institutions', in Knudten, op. cit., p.390.

18. M. Weber, Protestant Ethics and the Spirit of Capitalism, trans. by T. Parsons, New York, 1958, pp.35-36.

19. A.J. Mayer and H. Sharpe, 'Religious Preference and Worldly Success', in Knudten, op. cit., p.334.

20. Ibid., p.336.

belong to these churches, the remainder being Methodists, Presbyterians, Baptists, and members of fundamentalist sects, namely the Pentecostal Church, Church of God, Seventh Day Adventist, and Jehovah Witness. The sample of small farmers is a representative cross-section of religious affiliation as recorded in the 1960 census (Table 5.13).

TABLE 5.13 RELIGIOUS DENOMINATION: COMPARISON BETWEEN SAMPLE AND 1960 CENSUS

	Percentage	
Religious denomination	Sample	1960 census
Roman Catholic	52	57
Anglican	22	22
Seventh Day Adventist	9	1
Methodist	4	4
Pentecostal	3	1
Others*	10	15

* Includes Baptist, Church of God, Jehovah Witness, Presbyterian

The major difference between the sample and the census percentages is the sample's larger proportion of Seventh Day Adventists. This is seen as a result of recent (since 1960) proselytizing by this church, especially in the parishes of St Mark's and St Patrick's, and of its appeal to small farmers. Computer Map 2 shows the distribution of religious affiliation amongst the small farmers.

In order to show differentiation in the attainment of worldly of success between religious denominations, the following variables are considered: mean educational attainment, mean size of household, ratio of vehicles to population and the percentage of those in high

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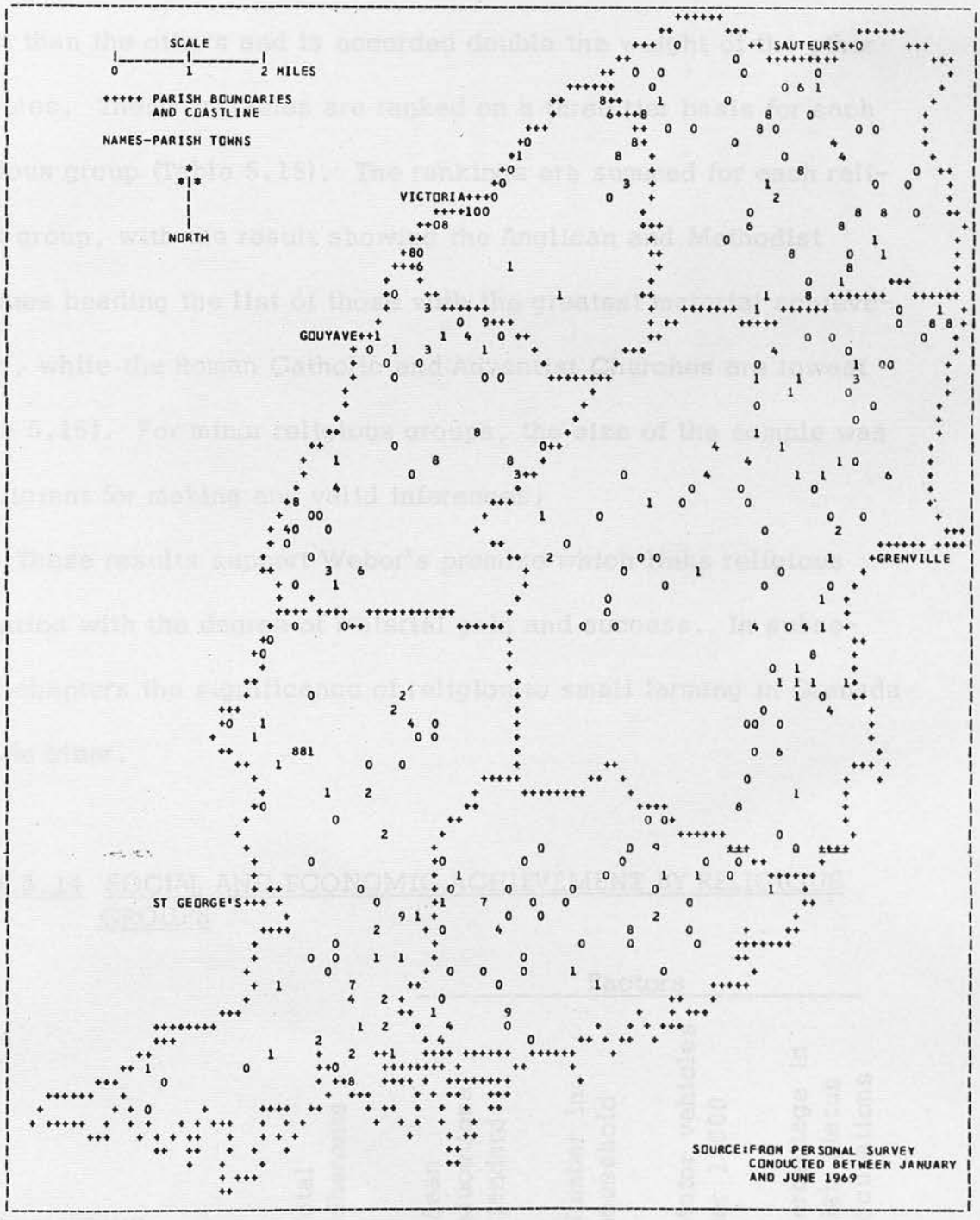
RELIGION



RELIGIOUS GROUPS

0 ROMAN CATHOLIC 1 ANGLICAN 2 METHODIST
3 PRESBYTERIAN 4 PENTECOSTAL 5 SALVATION ARMY
6 BAPTIST 7 PLYMOUTH BRETHEREN
8 7TH DAY ADVENTIST 9 JEHOVAH WITNESS

COMPUTER MAP 2

status positions, such as those in the professions, business men, some civil servants, those on private incomes and any retired person who had belonged to the aforementioned groups (Table 5.14). Of these variables, mean educational attainment is considered to be more significant than the others and is accorded double the weight of the other variables. These variables are ranked on a three tier basis for each religious group (Table 5.15). The rankings are summed for each religious group, with the result showing the Anglican and Methodist churches heading the list of those with the greatest material achievements, while the Roman Catholic and Adventist Churches are lowest (Table 5.16). For minor religious groups, the size of the sample was insufficient for making any valid inferences.

These results support Weber's premise which links religious affiliation with the degree of material gain and success. In subsequent chapters the significance of religion to small farming in Grenada is made clear.

TABLE 5.14 SOCIAL AND ECONOMIC ACHIEVEMENT BY RELIGIOUS GROUPS

		Factors			
Religious group	Total adherents	Mean educational standard	Number in household	Motor vehicles per 1,000	Percentage in high status occupations
Roman Catholic	152	4.26	5.45	105	5.5
Anglican	63	4.81	5.10	143	6.3
Seventh Day Adventist	27	4.59	6.81	74	-
Methodist	13	4.92	6.69	154	7.7
Pentecostal	9	4.22	3.56	111	-
Other churches	28	4.50	5.57	250	3.8

TABLE 5.15 RANKING SCORES ON THREE-TIER BASIS OF SOCIAL AND ECONOMIC FACTORS CONSIDERED IN TABLE 5.14

	Factors			
Religious group	Mean educational standard	Number in household	Motor vehicles per 1,000	Percentage in high status occupations
Roman Catholic	3	2	3	2
Anglican	1	1	2	1
Seventh Day Adventist	2	3	3	3
Methodist	1	3	1	1
Pentecostal	3	1	2	3
Other churches	2	2	1	2

TABLE 5.16 RANKING OF RELIGIOUS GROUPS ON BASIS OF RANKING SCORES

	Sum total of weighted ranking*
Anglican	6
Methodist	7
Other churches	9
Pentecostal	12
Seventh Day Adventist	13
Roman Catholic	13

*Education Rank received double weighting

Race

In the same way that religious beliefs are considered to influence an individual's social and economic behaviour, so too does association with a racial group. Differences between racial groups, especially in their attitude to working land, have their explanation in history and are

a vestige from the days of West Indian slavery and plantocracy. At that time, it was a case of 'white is might and right' and black is slave, humble and subservient.[21] Miscegenation between these two groups gave a hybrid group, the coloured, whose brown skin allowed them privileges their black brothers did not have. They were frequently employed as house slaves rather than as field-hands, some received education and were given freedom and property by their fathers. Grenadians, like most West Indians, do not think of negroes, coloureds and whites as distinct groups, but in terms of varying shades of colour from black to white.[22] East Indians are usually regarded as a distinct group, although where they are found in small numbers they are associated with the black lower class and do not form a separate ethnic group.[23] Smith, in his study of Grenadian society, saw skin colour as symbolizing divergences of status and culture, with society divided into two parts: the majority, who are black, mainly rural, ill-housed, ill-educated, poor, of low status; and a minority, who are light, of mixed pigment, mainly urban, with fair housing, education, wealth and status.[24] The uneducated black often suffers from an inbred inferiority complex on the basis of his colour, and consequently he sees himself at the bottom of a colour-caste system which, as far as he is concerned,

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21. For a detailed discussion of the effect of slavery on the African see E. Williams, Capitalism and Slavery, London, 1964.

22. D. Manley, 'The West Indian Background' in S.K. Ruck (ed.), The West Indian Comes to England, London, 1960, p.25.

23. M.G. Smith, 'Ethnic and Cultural Pluralism in the British Caribbean', in Ethnic and Cultural Pluralism in Intertropical Communities, Brussels, 1957, p.442.

24. Ibid., p.16.

limits his achievements and thereby his ambition in life. It has been written with justification, that 'those hundred years of slavery had taught him that he was an individual and that life was short'.[25] Therefore he established a hedonistic philosophy, without regard for the future, and to save, or aspire for material goods, had little part in his basic thinking. Thus, he remains the subordinate group in society with little option but to work land for a livelihood. In this respect, emancipation did not improve the status of the Negro as he is still 'passionate for independence, and for him independence is not so much an assertion of pride as a desire to be left alone, not to be involved.'[26] Such attitudes work to the detriment of agriculture, but, as education becomes universal and black politicians, educators, doctors and lawyers gain recognition, these attitudes and prejudices will disappear. Black Power may be a movement which may serve as a useful catalyst in the process of replacing self-pity with pride.

The attitude of the remaining groups is more positive than that of the negro, so they show greater pride and enthusiasm in their work. Both coloureds and whites who are occupied in farming aspire to an estate-like operation on their land, striving to achieve or maintain the role of their predecessors. East Indians were not exposed to the injustices of slavery, and as those who came to Grenada in the mid-nineteenth century were Christians they were not subject to the submissive attitudes of a caste system. Working on the land does not have for them the unfortunate connotation that it does for the negro.

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25. V.S. Naipaul, The Middle Passage, London, 1962, p.140.

26. Devas, op. cit., p.163.

Consequently, their exploits on the land have been recognised. Devas writes that 'the East Indians have been industrious in the cultivation of the soil' and 'have certainly shown what can be done by careful economic and persistent work on the land'.[27] A recent United Nations report notes that Indian communities in Diego Piece and Malagon in St Mark's parish 'have shown that a good living can be made from intensively working small parcels of land'.[28] This illustrates the benefits of having a positive attitude to agriculture.

Four racial groups are recognized in the sample, the negro, coloured, East Indian and white. Classification was made according to phenotype as distinct from genotype, as this was more readily ascertained and indicative of how an individual would be regarded by society. Classification by racial group in the sample shows some discrepancies with that of the 1960 Census (Table 5.17). The higher proportion of whites and East Indians shows that the sample is not representative of the total population and that these racial groups are active in small farming. However, the difference between the sample and census percentages of negroes and coloureds is attributed in part to census-takers using both phenotype and genotype classification of these racial groups. The distribution of small farmers by racial groups is shown on Computer Map 3.

In later chapters, the effects of the psychological stigma of colour and race upon the structure and nature of small farming become apparent.

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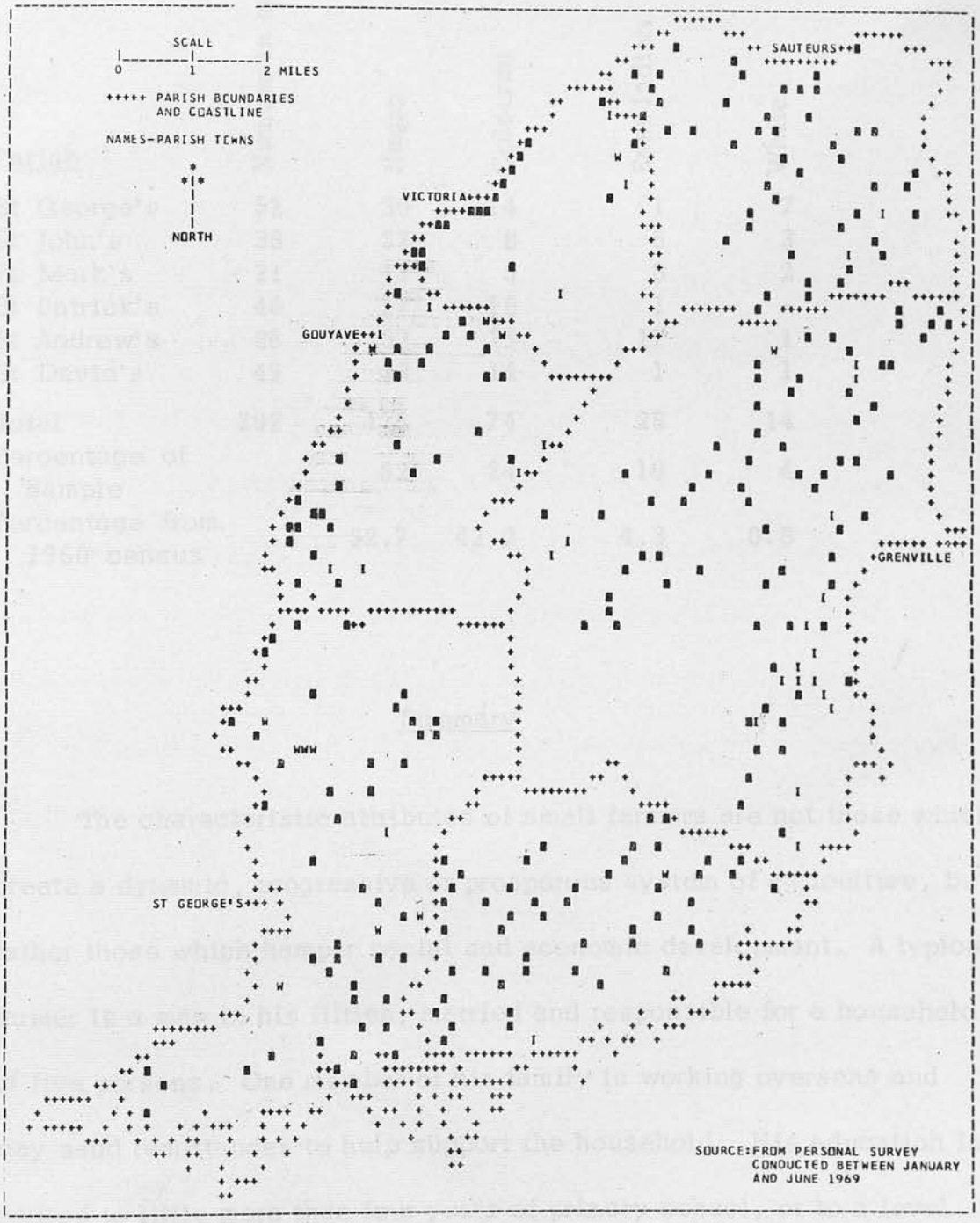
27. M.G. Smith, Stratification in Grenada, op. cit., p.16.

28. United Nations Development Program, Sauteurs, a Case Study, Barbados, 1968, p.37.

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
RACE



LEGEND
N NEGRO
C COLOURED
I INDIAN
W WHITE

COMPUTER MAP 3

TABLE 5.17 CLASSIFICATION OF SAMPLED SMALL FARMERS BY RACIAL GROUPS

Parish	Number in sample	Number in racial groups			
		Negro	Coloured	East Indian	White
St George's	52	30	14	1	7
St John's	38	22	8	5	3
St Mark's	21	11	5	3	2
St Patrick's	46	27	18	1	-
St Andrew's	86	53	15	17	1
St David's	49	33	14	1	1
Total	292	176	74	28	14
Percentage of sample		62	24	10	4
Percentage from 1960 census		52.7	42.2	4.3	0.8

Summary

The characteristic attributes of small farmers are not those which create a dynamic, progressive or prosperous system of agriculture, but rather those which hamper social and economic development. A typical farmer is a man in his fifties, married and responsible for a household of five persons. One member of his family is working overseas and may send remittances to help support the household. His education is limited to little more than four years of primary school, or to a level whereby he reads and writes with difficulty. Most of his working life has been spent employed as an unskilled or semi-skilled labourer on an estate. It is a result of his low wages in relation to the price of

land and the size of his household, which makes saving of capital a slow and difficult process, that he does not become an independent farmer until he is in his fifties. The basis of his farming knowledge is the experience gained working on an estate and on the land of his parents. Consequently his methods of farming are unscientific and strongly influenced by traditional beliefs. His level of living is low, as apart from his house which is a small wooden shack containing sparse furniture, his only luxuries are a transistor radio and a small gas stove. This lack of goods and services, while indicative of his poverty, also reflects his lack of ambition to take advantage of the assets at his disposal and turn them into material wealth and success. Such an attitude stems in part from his religious beliefs and racial background, because as a Roman Catholic and a negro he has an association with a church and a racial group which do not instil a strong sense of economic motivation. It is this social background of the farmer which determines in large part the nature of small farming and curtails economic development.

CHAPTER 6

SMALL FARMERS' HOLDINGS: THEIR SIZE, TENURE AND FRAGMENTATION

Introduction

Land is a feature of the economy of small farmers which was not considered in the previous chapter as it is of sufficient importance to this thesis to merit separate examination. Its discussion in this chapter completes both the preliminary analysis of the small farm and the presentation of information fundamental to an understanding of subsequent chapters.

The basic problems of the small farmer's holding principally stem from the combination of pressure of population, the system of joint inheritance (whereby each child in the family receives more or less an equal proportion of land) and the small acreage of land owned by the parents.[1] This combination of circumstances results in a farmer inheriting an even smaller parcel of land, with only a remote possibility that it is contiguous to any property which has previously been acquired. Fragmentation of holdings therefore ensues with the expansion of the farm and is essentially detrimental to farming efficiency. But fragmentation is not the only drawback to a viable farming system; the prevailing attitudes adopted with respect to the principal types of tenure, viz.

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1. Edwards, op. cit., p.93.

ownership, cash tenancy, and share-cropping, also limit the development and efficiency of farming systems. Thus forms of tenure and fragmentation are the focal points in this chapter. Farm size, too, is important in determining the nature and level of farming practice and its discussion introduces the examination of the small farmers' holdings.

Farm size

Although the range in the size of the small farmers' holdings is between 1 and 15 acres (supra, p.xxv), the average land area occupied by farmers is only 4.08 acres. Of the parishes, St Mark's and St John's have a mean farm size notably larger than the others (Table 6.1). This is due partly to their lower density of population (Table 3.1) and the availability of land in these parishes following the break-up of estates in the 1950s. This difference in farm size also reflects the nature and structure of the farms and is therefore considered in detail in subsequent chapters.

TABLE 6.1 FARM SIZE OF SAMPLED SMALL FARMS

Parish	Mean farm size (acres)
St George's	3.56
St John's	5.17
St Mark's	6.76
St Patrick's	3.22
St Andrew's	3.84
St David's	3.80
Total sample	4.08

Land tenure

Freehold tenure or ownership

It has been noted that all small farmers believe ownership of land to be the only real and permanent source of security and independence (supra, p.75). A farmer's prestige and status are therefore accorded in proportion to the number of acres he owns.[2] In the past, labourers in Grenada have been fortunate in being 'afforded widespread opportunities for acquiring small holdings'.[3] The first of these opportunities was during the nineteenth century when the metayer system was employed to establish cocoa on former sugar-cane land. Also in the latter half of the nineteenth century, the East Indian acquired a couple of acres with the completion of his indentureship (supra, p. 6). More recently there were other opportunities to purchase land as civil unrest and labour disputes in 1951 caused many estates to be sold. Occasionally these estates were subdivided into parcels whose selling price was within the means of some artisans and enterprising individuals. Four years later in 1955 the destruction wrought by Hurricane Janet caused the break-up and sale of more estates. The result of these disturbances during the 1950s is seen in the increase in the number of holdings between 1 and 10 acres, and the decrease in the number of estates of more than 200 acres in size (Table 6.2).

In addition to buying land, ownership is also acquired through inheritance. Such property is commonly referred to as family land and

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2. Smith and Kruijer, op. cit., p.4.

3. Shepherd, op. cit., p.70.

TABLE 6.2 NUMBER OF SMALL HOLDINGS COMPARED WITH NUMBER OF ESTATES

Year	Number of holdings	
	1-10 acres	More than 200 acres
1946	4,842	109
1961	6,469	81

Source: Agriculture Census for 1946 and 1961

is often the object of special sentimental attachment to the farmer.[4] By the principle of joint inheritance, which operates widely among small farmers, each heir receives an equal share of the family property unless otherwise denoted in a will. Yet subdivision of this land may not occur, since a solution which is acceptable to all heirs cannot be found and a legal settlement would cost more in lawyer's fees than the land is worth. Consequently the piece of property becomes undivided family land and is either abandoned, because working it would arouse family antagonism, or worked by an agreement between heirs whereby one acts as a trustee and is permitted to occupy the land, although other members of the family have the option to claim their share. Failure to use land does not imply forfeiting ownership, so that if an heir is overseas and cannot be contacted, the problem of this land can remain unresolved. Thus, a farmer in St Patrick's parish, because he had been unable to inform his two brothers in England of their father's death and therefore lacked their consent to work the family land, felt obliged to work only half an acre as a subsistence plot, and had left over seven acres of fertile, unfragmented land in an unproductive state for eight years. Fortunately

4. Edwards, op. cit., p.94.

the situation represented by this example is rare, but it is indicative of the general attitude of reverence and respect which is shown to inherited property.

No distinction was made in the questionnaire between purchased land and family land, but it is estimated that family land represents about 10 per cent of all land owned by small farmers. This proportion is subject to error as there was a tendency by some farmers to ignore the existence of family land because it was either non-productive, a reminder of an unsettled family dispute, or less than quarter of an acre in size and therefore unimportant in comparison to the rest of their holdings. Nevertheless, the reverence and tradition associated with family land are sufficiently strong almost to prohibit its sale[5] whatever its size. Consequently it is retained for non-economic reasons, thereby compounding the pattern of tenure and aggravating the fragmentation of holdings.

Small farmers own 75 per cent of all land they occupy (Table 6.3). With the exception of family land, this property is characterized by being the most intensively farmed, receiving a greater input of labour and capital per unit area than land occupied in other types of tenure. Some of the characteristics of the average fragment which is owned are presented in Table 6.4 for comparison with fragments held in other forms of tenure.

The farmer who owns land has security of tenure and is therefore likely to make long-term investments on his land, such as planting permanent tree crops and requisite wind breaks, installing contour and

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5. Ibid., p.98.

TABLE 6.3 LAND TENURE BY PERCENTAGE OF LAND OCCUPIED BY SAMPLED SMALL FARMERS

Parish	Percentage land by types of tenure			
	Ownership	Rent	Share-crop	Others*
St George's	72	13	10	5
St John's	65	30	-	5
St Mark's	75	17	-	8
St Patrick's	78	17	1	4
St Andrew's	74	12	-	14
St David's	79	12	2	7
Total sample	75	15	2	8

* Includes provision grounds on estates and land held in trusteeship

TABLE 6.4 COMPARISON OF THE CHARACTERISTICS OF FRAGMENTS OF LAND OCCUPIED BY SAMPLED SMALL FARMERS UNDER VARIOUS FORMS OF TENURE

Parish	Types of tenure: Owned				Rented			
	d	s	w	%ws	d	s	w	%ws
St George's	.4	1.69	.39	23	1.0	1.13	.14	12
St John's	1.2	2.60	.49	22	.8	.81	.09	11
St Mark's	1.0	2.83	.35	12	2.0	2.44	.46	20
St Patrick's	.9	1.61	.21	13	1.2	1.85	.13	10
St Andrew's	.9	1.57	.24	15	1.0	1.42	.24	17
St David's	1.0	1.50	.35	23	1.0	.96	.10	10
Total	.8	1.81	.32	18	1.2	1.31	.17	13

Parish	Types of tenure: Share-cropped				Other*			
	d	s	w	%ws	d	s	w	%ws
St George's	.7	1.54	.13	8	.8	1.14	.03	3
St John's	-	-	-	-	.3	.96	.68	70
St Mark's	-	-	-	-	1.3	4.30	1.40	32
St Patrick's	1.2	2.0	0.0	0	1.4	.50	.16	32
St Andrew's	-	-	-	-	1.6	.36	.10	28
St David's	.7	2.0	.15	7	.4	1.08	.13	12
Total	.8	1.70	.13	8	1.2	.98	.40	41

d = mean distance in miles to fragment
s = mean acreage of fragment
w = mean acreage of waste land
%ws = percentage of waste land of total fragment size

down drains, using manure and fertilizer, practising a system of rotating fallow in land used principally for food crops, and constructing all-weather access to this land where it is not the house spot. Another advantage of ownership is its use as security in the obtaining of farm improvement loans.

There are problems associated with the buying of land in Grenada. The principal one is the price of land in relation to the wages paid to estate workers and unskilled labourers. At the time of the survey an acre of uncultivated land of average slope and fertility cost between $400 and $600, while the total earnings of an estate worker average around $250 per annum.[6] With the expense of maintaining large families (supra, p.87), most small farmers find saving difficult, and consequently, unless they have worked abroad, ownership of a small farm is not attained until they are around fifty years of age. Therefore, by the time they have established permanent crops on their land, most farmers are no longer physically capable of working to maximize their returns from the land. The result is the abandonment of some of the holdings and the neglect of certain jobs, such as cleaning of drains, pruning of trees and weeding, unless another member of the household has the energy and interest to assist. Farmers should be given every encouragement, including financial aid, to purchase land when they are 20 or 30 years of age and fit. This aid would enable them to make a greater

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6. Estimates supplied by extension instructors from different districts of Grenada. The Tripartite Economic Survey notes that for the Eastern Caribbean the price of land is surprisingly high, and that $1,000 per acre is common. It did not qualify the condition of the land as to whether or not it was established in tree crops.

contribution to agriculture on the island, as they would work their own land with more interest and diligence than they would display on an estate.

Cash tenancy or rent

Small farmers consider cash tenancy to be generally an undesirable form of land tenancy, to be undertaken only in special circumstances, e.g. for a housespot (a local term for the house site) when purchase is impossible or impracticable, or for a conveniently located provision ground. This attitude is justified, as it complements the farmer's concept of ownership which is associated with manifesting his independence, so that to rent land is to rely on a landlord and to be under what many believe to be a modern equivalent of slavery. Not surprisingly, the opinion expressed by most small farmers is that they prefer to wait until they have accrued sufficient capital for purchase of land rather than to rent land during an interim period. Another reason which discourages cash tenancy is the desire of small farmers to establish land in cocoa, nutmegs and bananas. The initial investment of time and money needed to establish land in these tree crops, together with a period of seven years before maximum production from cocoa trees is reached, and even longer for nutmeg trees, requires security of tenure for their cultivation to be economically feasible. Cash tenancy generally does not offer this security, since land is usually rented on an annual basis as opposed to being leased for a number of years, and thus there exists the possibility that notice to quite may be given at any time.

Cash tenancy accounts for 15 per cent of the land which the small farmer occupies (Table 6.3). Only in St John's parish, where the level of living for small farmers is lowest (Table 5.12), is the area of rented land appreciably greater (30 per cent). This relationship between cash tenancy and poorer farmers reflects the distribution of estate-workers and the regional difficulty in purchasing land. Estate-workers are the principal group of small farmers engaging in cash tenancy. They usually rent 1 or 2 acres of the outlying portions of the estate where they are employed. As this tenancy is regarded 'more often as a reward to a worthy ... labourer than a distinct commercial proposition'[7] they pay a minimal annual rent of between $5 and $10 per acre. As a rule the land allocated for such occupancy is that which the estate regards as economically unprofitable because its location is isolated and its slopes of E and F categories on Capitol or Woburn Clay Loams and therefore unsuitable for cultivation (supra, p.26). Consequently the tenant bestows little care and attention on this land, being principally concerned with getting a quick crop from a minimum of effort and investment.

> This tenant mentality is a barrier, both to the proper management of the farm, and to obtaining the major goals of these farmers, sufficient food and money.[8]

Estate workers are not permitted to establish their house on this land and for this purpose they may rent an eighth- or quarter-acre housespot from the estate. Such land is often on a level piece of ground near the

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7. Shepherd, op. cit., p.69.

8. G.J. Kruijer, Sociological Report on the Christiana Area, Jamaica, Government Printer, Kingston, 1965, p.2.

centre of estate activity. Around his house the tenant cultivates a modest kitchen garden.

Not all rented land is found on estates. Some farmers, with housespots too small for an adequate kitchen garden, require a piece of land close to their home where they can raise those food crops which require regular attention and maintenance. When such property cannot be bought, because it is either not for sale or being offered at a price which the farmer cannot pay, the land may be rented. Again, lacking security of tenure, the farmer is reluctant to make improvements on the land and cultivates only short-term crops.

The remaining type of cash-tenancy is one where the land is cultivated in permanent crops and attention paid to farming methods. This type exists when an enterprising farmer rents 4 or 5 acres of land from an estate or from a farmer who is no longer able to work or manage all his farm. As it is likely that this land is already established in tree crops such as cocoa and nutmegs, the landlord carefully selects a tenant who he assumes will be responsible and unlikely to ravage either the soil or the crops. The tenant, on the other hand, considers it a privilege to work established land, and realizes that, in order to maximize his returns and retain his tenancy, he must make improvements on the land by pruning and spraying the trees, applying fertilizer, controlling weeds and maintaining drainage ditches. In some instances leases exceeding a three-year period are held, and these provide greater security of tenure than is usually associated with cash tenancy. Unfortunately, few land-owners are prepared to rent land on this basis and only 19 per cent of all rented land is occupied in this way.

The major characteristics of the average fragment of rented land are that it is half an acre smaller and has a smaller proportion of land-waste than fragments which are owned (Table 6.4). Although these differences reflect the conditions under which land is occupied by cash tenancy, they do not reveal the mismanagement of land which is too commonly a feature of these fragments.

Share-cropping or colonage

Although it is debatable whether share-cropping is a system of land tenure or, as Shepherd considers it, 'a method of paying wages in kind in lieu of cash',[9] it is considered as tenancy because the farmer accepts some responsibility for the land and regards himself as having occupancy of it.

Small farmers who share-crop land are found almost exclusively in the sugar-cane belt which is associated with the BSh climate (supra, p.34). The practice of share-cropping originated in the latter half of the nineteenth century when prices and production of sugar-cane were low and planters unable to pay wages to their labourers. As a result, estates were subdivided and plots allocated to labourers for them to grow cane.[10] The planters in return would take a portion, usually a third, of the harvested cane. Today, the system is basically unchanged, although the share-cropper is allowed to augment his production by interplanting ground provisions among the young canes and feeding his cattle on the bagasse which litter the fields after the cane harvest. A common practice on plots of share-cropped land is for their location

9. Shepherd, op. cit., p.69.

10. Loc. cit.

to shift every couple of years to an area which requires fresh planting of cane setts. Thus, the planter exploits the share-cropper by getting him to renew old cane fields, while at the same time preventing him from identifying with a given plot. The reaction of the share-cropper is not to make improvements on this land, but to utilize it through a minimum of time and effort. The practice of share-cropping is on the wane, with government policy discouraging it and the 1969 increased minimum wage for a labourer making it no longer an attractive proposition for the small farmer.

Only 2 per cent of land occupied by small farmers is share-cropped; however, in St George's parish, which has the principal cane-farming region, the figure is 10 per cent (Table 6.3). Share-cropped land is usually in 1 or 2- acre parcels which have little waste land and are close to the home of the farmer (Table 6.4). It is part of the planter's policy to allow the share-cropper to work land in proximity to his home, since in this way he can double as a watchman over land in which he has a vested interest. On only one farm, in St Patrick's parish, is the practice of share-cropping not associated with cane growing. In this case the land is in cocoa, with an estate-worker having a share-cropping arrangement with the estate on which he is employed.

Other types of occupancy

There are two other types of occupancy by which small farmers work land, namely provision grounds of estate workers and land held in trusteeship. The questionnaire did not distinguish between the two and simply regarded them as 'other' forms of tenure.

The provision grounds of estate workers are a vestige from the days of slavery, when it was customary for the estate owner to allocate an acre or two to each slave to enable him to produce food crops, thereby reducing the owner's commitment to his slaves. Today, the practice is maintained on some estates as a privilege, as well as an inducement for attracting workers. However, estate owners are under no obligation to provide this land and can revoke this privilege at will, and the worker has no assurance of tenure. One estate in St John's parish requires its workers to clear steep, wooded slopes before they can plant their crops and then, after three years of working this land, the estate reclaims it for planting bananas; the workers are then expected to clear another area of forested land on the estate if they want a provision ground. Such exploitation gives the worker no encouragement to cultivate in a husbandlike manner, and results in a type of shifting cultivation being undertaken on land ill-suited for planting. The subsequent and inevitable erosion on this land is often serious and affects trees of permanent cultivation on lower slopes.

Trusteeship of land, or usufruct, occurs when a farmer looks after a piece of property for a friend, relative or neighbour, who is usually either ill or abroad; whatever the reason for trusteeship, the arrangement is a temporary one and the possibility of purchase or inheritance is remote. It is customary for the trustee to reap the harvest and keep a percentage of, or even all, the profits in return for maintaining the land in good condition. Despite the apparent attractiveness of such an arrangement, trustees rarely take advantage of it, and land

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11. Ibid., p.64.

held in trusteeship often has the appearance of having been abandoned, mainly because those entrusted with the land are respected full-time farmers in the community whose own land occupies all their working time. Farmers of lower status are unlikely to receive a trusteeship.

Provision grounds of estate-workers and land in trusteeship account for 8 per cent of the land occupied by small farmers (Table 6.3). Both types of tenancy represent some of the worst aspects of inefficient land use, e.g. poor farming methods and neglect. Over 40 per cent of this land is non-productive, the highest proportion for any form of tenure (Table 6.4). Such conditions manifest the unwillingness of small farmers to make even short-term investments where doubt surrounds the length and security of tenure.

Fragmentation of holdings

It is generally held that fragmentation of farm holdings acts as a deterrent to the growth and development of agriculture and a restraint to general economic efficiency. In countries as different as India and Sweden, governments have implemented policies of land reform in order to reduce, and ultimately to eliminate, the sub-division of farms into several scattered parcels. The West Indies is no exception, as fragmentation is considered to be excessive[12] and suggestions have been made that progress in agriculture can be achieved by 'an exchange of plots, designed to bring each farmer's plots together, without increasing the average amount of land worked by each farmer'.[13] The problem

12. E. de Vries, 'Existing social and economic patterns and trends', in E. de Vries (ed.), Social Research and Rural Life in Central America, Mexico and the Caribbean Region, Paris, 1966, p.59.

of fragmentation remains, since no solution has been found whereby adequate compensation is provided to farmers who have strong emotional ties to their land (supra, p.107) and whose farming behaviour is not necessarily influenced by economic motives.

Fragmentation is the normal corollary of land ownership occurring in a society where the system of joint inheritance is followed and where the pressure of population is high. These conditions are satisfied in Grenada, so that fragmentation characterizes the structure of small farms. The process of inheritance has reduced the 'size of individual holdings in an area from an economic size for a family to almost absurdly small pieces of land'.[14] For example, the average small farmer in this survey owns 3.0 acres, has five children, and therefore will leave each child 0.6 acre of his farm. Although the farmer's intention may be to provide each child with a separate fragment, few achieve this end, so that existing parcels of land are sub-divided on the death of the farmer. This system of inheritance, operating since emancipation, has succeeded in dissecting areas of small farming into increasingly small fragments of land, thereby making the purchase of blocks of land contiguous to the farmer's initial housespot expensive, difficult or impossible because of the complex pattern of ownership. The problem of acquiring land is further aggravated by the fact that a

> ... person owning land seldom considers selling it unless there appears to be no alternative, for apart from anything else he usually has the intention of leaving it to his

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13. W.A. Lewis, 'Issues in Land Settlement Policy', Caribbean Economic Review, Vol.3, nos. 1 and 2, October 1961, p.65.

14. Vernon, Payne and Spector, op. cit., p.28.

> children, and sometimes he buys it largely for this reason.... Every effort is made to keep land in the family....[15]

Small farms, therefore, grow in piecemeal fashion as farmers acquire whatever fragment is for sale at a price they can afford. These fragments vary in size from one-eighth to 15 acres, although 83 per cent of all fragments are less than 5 acres. Those who are in a financial position to buy fragments larger than 5 acres are mainly prosperous tradesmen or individuals who have worked abroad for long periods. Consequently the majority of small farmers have little option but to give secondary consideration to the actual location of land in relation to their home. In fact, there is little reason for giving priority to location since status is accorded to a small farmer in proportion to the amount of land owned irrespective of its location.

There can be little justification for fragmentation in Grenada, since it only contributes to the inefficiency of small farming. All the basic arguments against fragmentation are substantiated, in that it is 'extremely wasteful of labour, of capital (especially in the form of storage facilities and transport equipment) and even of land'.[16] More specifically the drawbacks of fragmentation are:-

1) that an inordinate amount of time and energy are involved in moving tools, livestock and fertilizer from parcel to parcel;
2) that there is difficulty in supervising any hired labour and in guarding against thievery;

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15. Edwards, op. cit., p.95.

16. P.T. Bauer and B.S. Yamey, The Economics of Under-developed Countries, London, 1957, p.177.

3) that a substantial amount of land is lost in boundaries, for the smaller the fragment, the larger the proportion of land utilized in boundaries;

4) that certain farm improvement schemes are dependent upon co-operation between farmers with adjacent fragments, otherwise weed, pest and disease control remain at the level of the worst-managed farm.[17]

Fragmentation also limits the type of agriculture that is practised.[18] For example, the possibility that produce can be stolen from fragments which are some distance from the house plot means that such fragments are largely planted in export crops which have no immediate local market. It is because stealing is accomplished with comparative ease on the dispersed fragments of a farm that livestock are not a notable feature of small farming.[19] The fact that many fragments are located in the wet, rugged interior of the island where there are few all-weather roads only intensifies the handicaps of fragmentation, as it limits the number of visits that can be made. As land in the mountains experiences cooler and more humid conditions, it could produce different crops, or the same crops at different times of the year, from those of the housespot. If this were done, there would be some justification for a small degree of fragmentation, but the small farmer does not consider land in the mountains from this standpoint, rather he regards it as being suitable for permanent tree crops, mainly nutmegs and cocoa, which need little attention. Generally these fragments are poorly worked because the

17. D. Grigg, The Harsh Lands, London, 1970, p.140.
18. A.L. Jolly, op.cit., p.46.
19. Loc. cit.

farmer is limited to easily-transported tools (usually no more specialized than a cutlass and a hoe) and by the infrequency of his visits, which become particularly arduous and erratic during the wet season. Thus, the location of the fragment in relation to the farmer's housespot influences both the nature and the intensity of its use. This topic is considered in greater detail later in this chapter, and more fully analysed in subsequent chapters.

Small farms consist on average of 2.38 pieces of land, with variation between the parishes from 1.93 in St Patrick's to 2.80 in St David's (Table 6.5). This variation reflects mainly differences in the size of the farm, the price of available land and the principal occupation and wealth of the farmer. Thus, the lower degree of fragmentation in St Patrick's parish is attributable to the small average size of the farms (Table 6.1) which in turn is related to theie occupiers' low level of living (Table 5.12) and the high proportion of women heading households (Table 5.7). On the other hand, the degree of fragmentation in St David's parish is seen as being due to the difficulty in acquiring parcels of land of a suitable size, because of their unavailability or high price, so that this parish has the smallest average size of fragment, 1.36 acres. Larger parcels of land are found in the parishes of St Mark's and St John's as a result of the break-up of estates. It is a reflection of the difficulty of acquiring sizeable fragments that the extreme case of fragmentation, where a farm of 9.5 acres is composed of 7 fragments, is located in St David's parish. In comparison to other parts of the world, this degree of fragmentation is not outstanding; for example, Taylor cites a case from the Fort Hall District in Middle

Kikuyu, Kenya, of a holding of 3.5 acres having 24 fragments.[20] Grenadian small farms are, by contrast, likely to consist of 1, 2 or 3 fragments, as only 45 farms, or 16 per cent, contain more than 3 pieces of land per farm (Table 6.6). Nevertheless, in the context of Grenadian agriculture, especially the limited resources at the disposal of small farmers, this degree of fragmentation represents a serious economic burden which restricts both the quantity and quality of production.

TABLE 6.5 FRAGMENTATION OF SAMPLED SMALL FARMS

Parish	Average no. of fragments per farm	Average size of fragments (acres)
St George's	2.10	1.70
St John's	2.58	2.00
St Mark's	2.43	2.74
St Patrick's	1.93	1.68
St Andrew's	2.45	1.56
St David's	2.80	1.36
Total sample	2.38	1.71

TABLE 6.6 SAMPLED SMALL FARMS BY NUMBER OF FRAGMENTS

Number of fragments per farm	Number of farms	Percentage of total number
1	86	29
2	80	27
3	81	27
4	26	9
5	15	5
6	2	1
7	2	1
ALL	292	100

20. D.R.F. Taylor, 'Agricultural Change in Kikuyuland', in M.F. Thomas and G.W. Whittington (ed.), Environment and Land Use in Africa, London, 1969, p.473.

Patterns of tenure and land use with respect to fragmentation

Allusion has been made to the fact that use of land is affected by the geographical distribution of fragments comprising a farm, as well as by their type of tenancy. For purposes of identification and analysis, fragments in individual farms were numbered in relation to their distance from the housespot. Therefore the plot of land on which the house is situated is Fragment 1, unless it is merely occupied by a house with no land for cultivation, then the nearest piece of land is considered Fragment 1; the fragment furthest from the home has the highest number. Since the farmer was asked to consider the fragments separately and in the order of their fragment numbers, it is assumed that some element of perceptual distance is incorporated in the analysis. This will not detract from the results, as perceived distance is likely to influence land use in the same way as actual distance. Unfortunately, this survey was not designed to test aspects of perceptual distance, although it does recognise that it could be a real factor influencing land use.

Analysis of the characteristics of fragments is made by considering all pieces of land by their fragment number. The results show that Fragment 1 has the highest frequency of ownership of any fragment, 84 per cent, and the lowest proportion of wasteland, 11 per cent, indicating that security of tenure does tend to intensify the use of the land (Table 6.7). A distinctive feature of Fragment 1 is its kitchen garden[21]

21. A distinction is made between kitchen garden and provision ground although the same crops are cultivated on each. The kitchen garden is land immediately around the house where food trees and food crops are found. The provision ground is a plot

TABLE 6.7 CHARACTERISTICS OF LAND USE AND TENURE WITH RESPECT TO DISPERSION OF FRAGMENTS

Parish	Fragment no.	Number of farms with fragment	Tenure % of fragments owned	Mean distance from housespot (miles)	Mean size of fragment (acres)	Mean area in pasture (acres)	Mean area in waste (acres)	% waste of area of fragment
St George's	1	52	87	.0	1.55	.20	.15	10
	2	28	62	.7	1.46	.14	.33	22
	3	18	67	1.1	1.33	.14	.56	46
	4	6	43	1.3	2.39	.07	.29	12
	5	3	50	1.2	3.75	.63	1.50	40
	6	1	100	1.3	1.00	.00	.00	0
	7	1	0	2.5	2.00	.00	.00	0
St John's	1	38	78	.1	2.05	.07	.27	13
	2	32	63	1.2	2.22	.11	.54	24
	3	14	60	.9	1.55	.00	.21	14
	4	8	50	1.6	2.22	.00	.72	32
	5	5	10	2.1	.90	.00	.16	18
	6	1	0	2.0	1.00	.00	.00	0
St Mark's	1	21	80	.4	2.30	.00	.25	11
	2	19	79	1.6	3.48	.05	.61	17
	3	8	50	2.1	2.85	.00	.25	9
	4	3	50	2.9	6.00	.00	3.25	54
St Patrick's	1	46	86	.2	1.64	.01	.19	12
	2	22	65	1.4	1.92	.02	.19	10
	3	15	75	2.3	0.94	.00	.28	30
	4	4	80	1.6	0.96	.06	.16	17
	5	2	75	1.8	1.60	.02	.20	13

separate from the house where the same trees and crops are found. A provision ground is not restricted to the cultivation of ground provisions.

TABLE 6.7

Parish	Fragment no.	Number of farms with fragment	Tenure % of fragments owned	Mean distance from housespot (miles)	Mean size of fragment (acres)	Mean area in pasture (acres)	Mean area in waste (acres)	% waste of area of fragment
St Andrew's	1	86	82	.1	1.57	.01	.20	13
	2	68	76	1.2	1.31	.07	.25	19
	3	39	72	1.4	1.79	.05	.25	14
	4	12	75	1.4	1.58	.00	.27	16
	5	4	25	1.9	2.93	.00	1.43	50
	6	1	0	1.0	0.20	.00	.00	0
St David's	1	49	88	.0	1.59	.02	.28	16
	2	37	72	1.2	1.13	.02	.27	24
	3	32	70	1.5	1.36	.00	.27	20
	4	12	89	1.3	2.37	.00	.67	28
	5	5	83	2.7	1.37	.00	.08	6
	6	1	100	2.5	1.00	.00	1.00	100
	7	1	100	6.0	1.80	.00	.50	28
Total sample	1	292	84	.02	1.70	.02	.18	11
	2	206	69	1.3	1.70	.03	.32	19
	3	176	68	1.4	1.61	.04	.30	19
	4	45	70	1.5	2.16	.01	.56	26
	5	19	75	1.8	2.05	.00	.68	33
	6	4	50	1.7	1.08	.00	.25	23
	7	2	50	4.2	1.90	.00	.25	13

which is in the immediate vicinity of the home and contains those food crops consumed daily and requiring close attention, namely salad vegetables, legumes, ground provisions and a variety of food and fruit trees. In the yard around the house, poultry and pigs are often present and have unrestricted movement over most of the property. Other livestock, such as goats, sheep and cattle, are less numerous, but where present are penned or tethered near the house overnight as a precaution against theft. Their manure is used on the food crops. During the day these animals are grazed on fragments and roadside grass verges where the farmer or a friend can maintain a watchful eye over them. Not all the 1.70 acres of Fragment 1 are devoted to the kitchen garden and livestock; a proportion is in export crops which are either permanent, such as nutmegs and cocoa, or semi-permanent, such as bananas.

Fragments 2 and 3 have almost identical characteristics; they are situated more than a mile from the housespot, have lower percentage of ownership than Fragment 1 and are less intensively farmed, as indicated by a greater proportion of land in waste and pasture. Although land use on these fragments is dominated by export crops, provision grounds are a notable feature, as in the case of an estate worker with his parcel of estate land (supra, p.115). As a rule, food crops grown on these fragments require little attention when growing and are unattractive to thieves because they have little commercial value, such crops include ground provisions, pigeon peas and corn. Livestock are brought to these fragments for grazing and where penned supply manure for the provision grounds.

There is an increase in the average size of Fragments 4 and 5

over that of the previous fragments, as each is over 2 acres in size (Table 6.7). These fragments are often in the mountainous interior of the island where forested land is available in larger parcels and at lower prices than elsewhere. The increased proportion of unproductive land (33 per cent) for Fragment 5 is attributable both to lack of clearing of forested woodland prior to cultivation and abandonment of previous cultivation by more elderly farmers. Most of these parcels of land have some security of tenure, as they are either owned or held in trusteeship, so that permanent tree crops are the dominant feature of their cultivation.

The sample of Fragments 6 and 7 is too small for generalisations to be made about their character. What inferences can be made suggest a break in the pattern which emerged from Fragments 1-5, i.e. a stable level of ownership after Fragment 1, and a steadily increasing proportion of wasteland as the fragments get further from the house (Table 6.7). A possible explanation for this phenomenon is that holdings with 6 and 7 fragments represent the larger of the small farms and are, therefore, operated by more dedicated farmers who have prospered on the land despite having built up their farms piecemeal. It is perhaps indicative of their ability to manage their land of their interest in agriculture that there is a lower average proportion of wasteland on Fragments 6 and 7 than the overall average for Fragments 4 and 5.

Summary and conclusion

Both tenure and fragmentation of the small farmer's holding represent basic problems in agricultural development. Although farmers

own a considerable proportion of the land they occupy, there is all too small a proportion of rented land in view of the high price of land relative to the earning power of most farmers. Because individual possession is so highly regarded and because cash tenancy possesses inadequate security, a farmer is likely to remain in the employment of others in order to save and eventually purchase land, rather than rent land and become an independent farmer while relatively young. Consequently, labourers are often 40 years of age before they own their first piece of land, so that much of their most active working life is not spent on their farm.

The custom of joint inheritance functioning in a society with a high density of population has resulted in the fragmentation of holdings. To most farmers it is an inevitable, as well as a traditional, feature of small farming and, while it seriously curtails the nature and efficiency of agriculture, some farmers still consider fragmentation as beneficial. Of its benefits, the most noteworthy are the insurance given by widely dispersed fragments against total destruction of crops by wind, disease or pests, and the fact that scattered parcels of land present the opportunity for more social contact and recognition within the community than is offered by a farm of a single unit. Fragmentation cannot be justified on these grounds, however, as the island has reached a stage in its economic development where the government should pay compensation to farmers whose land is damaged by acts of God and also provide against disease and pests. Farmers who tend to operate their holdings as a social institution should realize the importance of economic efficiency in agriculture and no longer tolerate the wanton wastefulness of undivided family land, fragmentation, abandonment and neglect.

CHAPTER 7

CATEGORIES OF SMALL FARMERS

NON-COMMERCIAL FARMERS

Introduction

In the foregoing chapters three major sets of factors influencing the nature of the smallholders' agricultural enterprise have been discussed. First, the physical setting was examined and particular emphasis was given to climate and soils. Secondly, the socio-economic landscape of the parishes was constructed and ranked by the level of its development; and thirdly, the social and economic characteristics of the sampled small farmers, together with a separate discussion of land-tenure and fragmentation of their holdings, were presented. Using these factors as a backdrop, the stage is set for examination of the nature of agriculture as practised by these small farmers.

It was expected that analysis of the sample of parishes would reveal differences in levels of farming and that these differences would relate to elements in these three sets. The nature of the data does not permit statistical analysis of the relationships between these elements, but they may be qualitatively identifiable as forces influencing, or even determining, patterns of agriculture. This will provide insight into the limiting factors, or 'tension points'[1] restricting development among small farmers.

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1. Blaut, op. cit., p.219.

Methods of classification

Analysis of levels of farming is facilitated by considering groups of small farmers with similar agriculture systems. It is preferable in making such groupings for each category to have representation in each parish, for the sample number in each category to be statistically meaningful, and for the categories to be interrelated. Such specifications eliminate some of the more widely used classifications. For example, neither division by farming type nor division by physical region provides sufficiently large samples in each parish to serve as a useful category. Farming type, as determined by the nature of production (a method frequently used by economists and agricultural geographers), would be impossible to apply to these smallholders since most do not keep records of their income derived from any one crop. Where mixed cultivation is so prevalent sharp distinctions between, for example, a 'cocoa producing farm' and a 'nutmeg orchard' would have been meaningless. To have used 'mixed cultivation' or 'cash crop production' as categories would not bring out distinctions in patterns of agriculture.

As the survey obtained no figures on farm production or earnings, farmers could not be classified by these criteria. However, indicators of the economic scale are the number of acres the smallholder occupies which are in cultivation or pasture but not in waste, and the farmer's dependence upon this land as a source of income. Both these pieces of information are readily extracted from the questionnaire, the former obtained from page 4, the latter from question I,2. On the basis of

the proportion of income derived from the sale of agricultural produce, the smallholder can be classified as follows:

i) non-commercial, having no sale of his produce;

ii) semi-commercial, having up to half his income from his agricultural enterprise;

ii) commercial, obtaining half or more of his income from the sale of farm produce.

This three-fold classification is one of several methods suggested by Blaut (1967) when he recognised the problems of developing a general purpose geographic classification of farming systems in the Tropics.[2] Such a method of classification does not take into account the scale of production or the importance of agricultural income to his total income. This is achieved when the area of land in cultivation, an indicator of the scale of production, and the proportion of agricultural income, an indicator of his commitment to farming, are considered jointly. A plot of the amount of cultivated land against the category of income proportion (Fig. 12) would, if it showed distinct groups of farms, reveal something about the structure of small farming. The result, although it revealed no distinct clusters, does show certain distinct characteristics of the structure of small farming. Farmers with no sale of agricultural produce have two acres or less in cultivation. Other acreage limits can be established which reflect differing commitments to small farming. Of 133 holdings classified as commercial only 5 had 1 acre or less in cultivation, while 29 had between 1 and 2 acres. This suggests a break-point at 1 acre as farms with less than this

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1. Ibid., p.221.

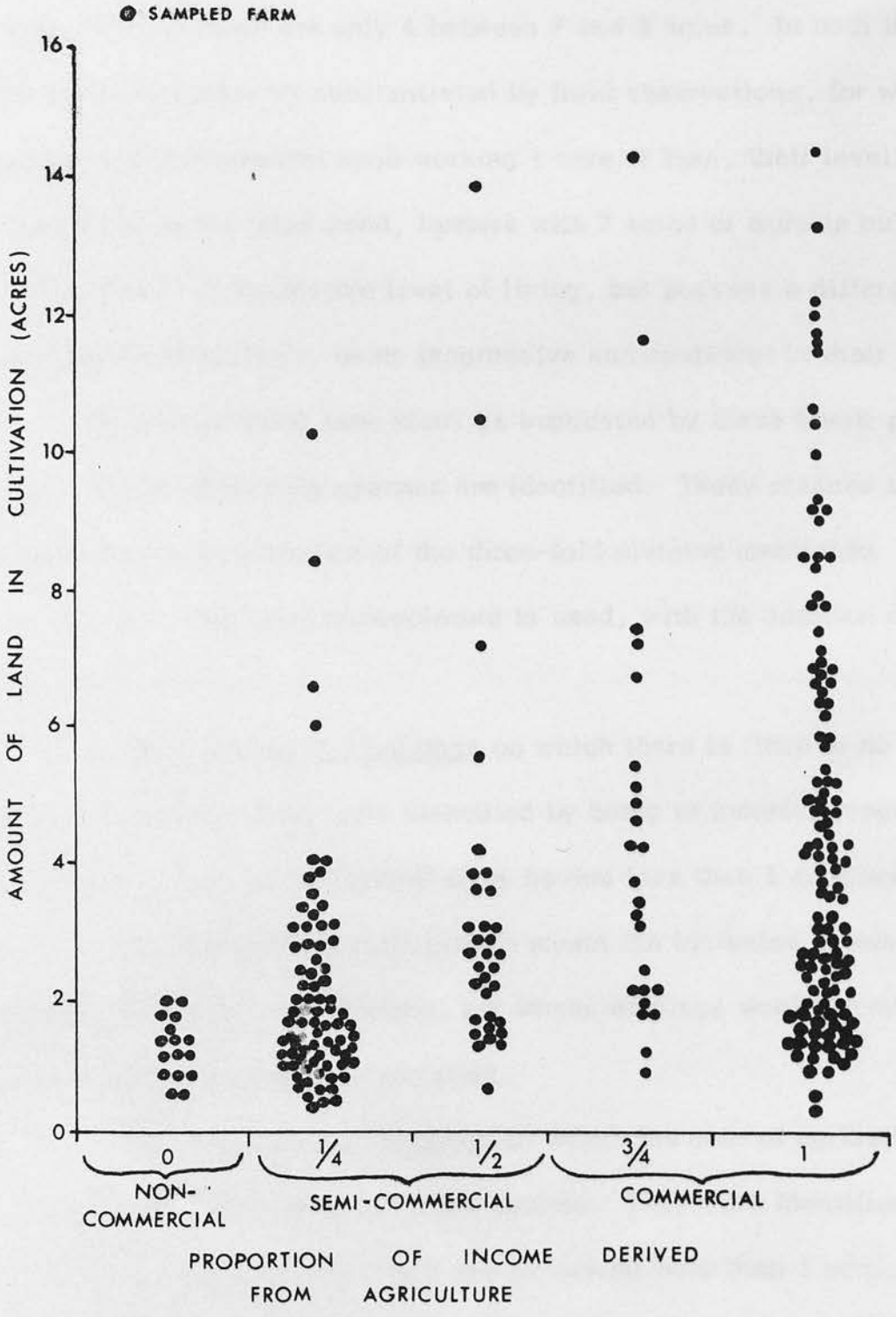
SAMPLED FARM
AMOUNT OF LAND IN CULTIVATION (ACRES)
16
14
12
10
8
6
4
2
0
0
1/4
1/2
3/4
1
NON-COMMERCIAL
SEMI-COMMERCIAL
COMMERCIAL
PROPORTION OF INCOME DERIVED FROM AGRICULTURE

FIGURE 12

amount of land in cultivation derive a meagre income from the sale of agricultural produce, estimated by extension instructors to be less than $150 per annum. Similarly a break occurs at 7 acres where 12 farmers in the same income category have between 6 and 7 acres of cultivated land, and yet there are only 4 between 7 and 8 acres. In both instances, these break-points are substantiated by field observations, for where a household is dependent upon working 1 acre or less, their level of living is pitiful; on the other hand, farmers with 7 acres or more in cultivation not only have a distinctive level of living, but possess a different attitude to agriculture, being progressive and confident in their approach.

By incorporating farm size, as suggested by these break-points, four classes of farming systems are identified. These classes are essentially a modification of the three-fold division mentioned previously. The same nomenclature is used, with the addition of miniature estate.

1. Non-commercial holdings on which there is little or no sale of farm produce. They were identified by being in income category 0 (question I,2 on questionnaire) or by having less than 1 acre under cultivation. This latter qualification meant the inclusion of some small-holders who sold some produce, but whose earnings would be minimal after domestic needs were satisfied.

2. Semi-commercial holdings on which the sale of agricultural produce represents up to half their income. They were identified by being in income category 1 or 2 and by having more than 1 acre, but less than 7 acres in cultivation. The majority of farms in this group have less than 4 acres.

4. Miniature estates are farms on which more than 7 acres of land are in cultivation. Although this category could be considered part of the semi-commercial and commercial categories, it is distinguished by virtue of the scale of operation, as it represents a farming enterprise which requires hired labour, seasonally if not regularly. The category is so named because field experience showed that many such farmers not only modelled their farming system along estate lines, but also modelled their way of life and mode of dress on those of the typical owner or manager.

Most holdings are readily classified by applying the above criteria. In the few instances where the acreage was exactly 1 or 7 each questionnaire was examined separately. It was generally a matter of deciding whether a holding with 1 acre in cultivation and selling produce should be classified as non-commercial or semi-commercial. If food crops were sold then more intensive land use was suggested and the holding was considered semi-commercial. Should both food crops and export crops be sold, then soil type and slope of the respective farm land was considered as an indicator of whether sale was likely to be similar in amount to holdings with $1\frac{1}{4}$ acres in cultivation or not. Similarly, where 7 acres of land are in cultivation, production levels are determined by considering land use, soil capability and slope. The farm is then categorised accordingly.

The distribution of holdings into the various categories shows that miniature estates represent the smallest category with 36 holdings, 12.3 per cent of the sample, followed by non-commercial holdings with 42, 14.4 per cent. The largest category is the commercial farm,

of which there are 118 holdings, 40.5 per cent, followed by semi-commercial with 96, 32.8 per cent. The distribution of the four categories varies considerably with the parish (Table 7.1 and Fig. 13) and is discussed in subsequent chapters.

TABLE 7.1 DISTRIBUTION OF SMALL FARMERS BY CATEGORY OF FARM

	Number of farmers by categories of farms*			
Parish	Non-commercial	Semi-commercial	Commercial	Miniature Estate
St George's	10 (18.5)	17 (33.3)	22 (42.6)	3 (5.6)
St John's	7 (18.4)	7 (18.4)	14 (36.8)	10 (26.4)
St Mark's	3 (14.3)	6 (28.6)	4 (19.0)	8 (38.1)
St Patrick's	7 (14.6)	16 (37.5)	19 (39.6)	4 (8.3)
St Andrew's	10 (11.9)	30 (34.6)	38 (44.0)	8 (9.5)
St David's	5 (10.4)	20 (41.6)	21 (41.6)	3 (6.4)
Total	42 (14.4)	96 (33.2)	118 (40.0)	36 (12.4)

* Numbers in brackets represent percentages

Assessment of method of classification

This system of classification indicates stages in the normal trend of farm development from little more than subsistence farming, the non-commercial holding, to a viable economic agricultural unit, the miniature estate. However, these stages should not be regarded as sequential or evolutionary steps in agricultural development; it is not necessary for a non-commercial farmer to become semi-commercial before becoming commercial. For instance, if a smallholder employed on an estate has $1\frac{1}{2}$ acres and is classified as non-commercial, he may on retiring from estate work devote more time to his land and become dependent upon it

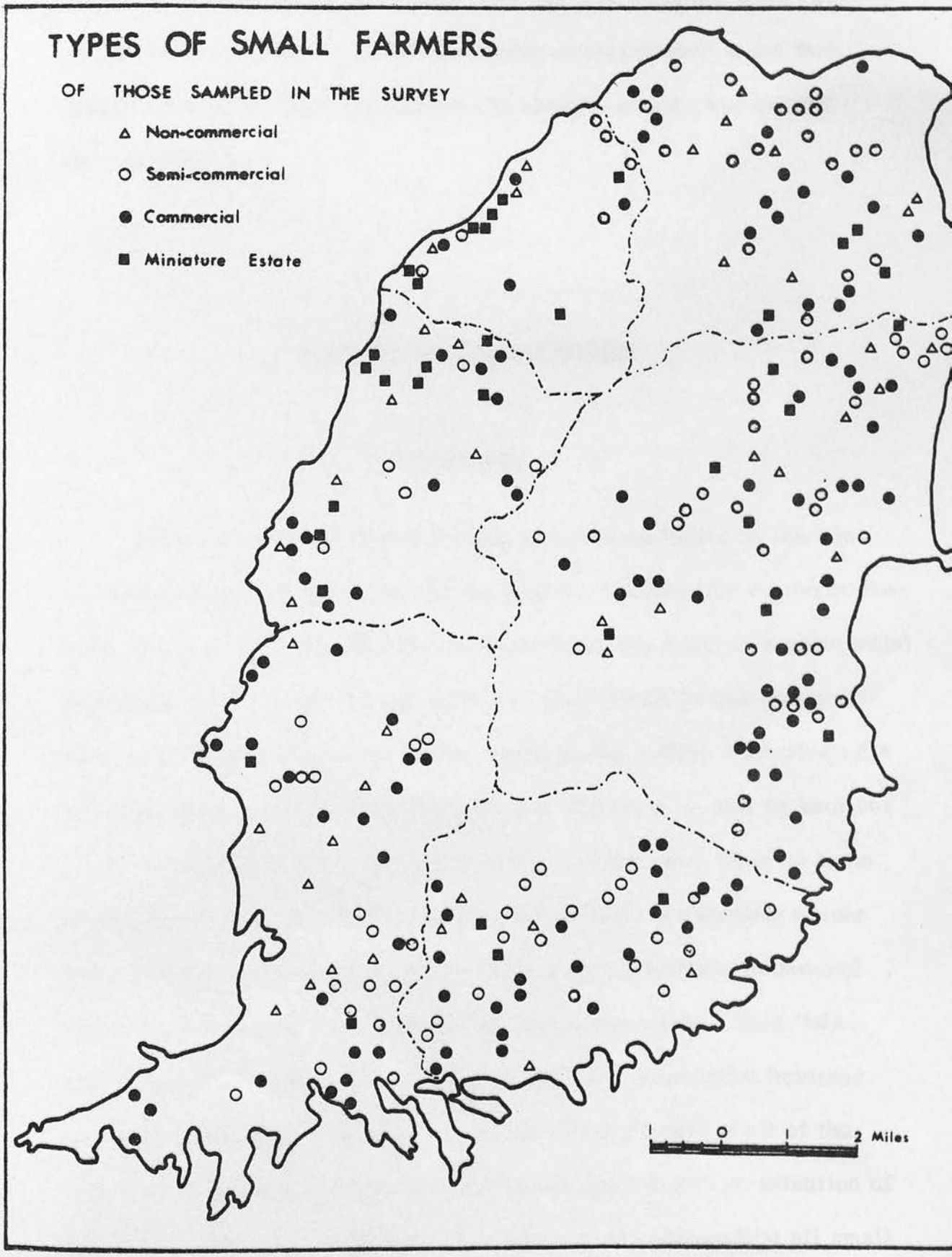
TYPES OF SMALL FARMERS
OF THOSE SAMPLED IN THE SURVEY
Non-commercial
Semi-commercial
Commercial
Miniature Estate
2 Miles

FIGURE 13

for his livelihood, and thereby becomes a commercial farmer provided he has more than 1 acre in cultivation. Alternatively, upon accruing capital he may rent or purchase additional land and move through each category in succession. Thus, there exists a continuum between these farm categories, which makes it feasible to observe change and growth between them.

NON-COMMERCIAL FARMERS

Introduction

At the very core of small farming in the West Indies is the non-commercial aspect, that of producing food for consumption by the household. This aspect can represent both the birth and death of a commercial farming system. In the former instance, the kitchen garden and provision ground of an estate worker can serve as the embryo from which his his agricultural confidence and production will grow so that he becomes a semi-commercial or commercial farmer. In later life, when he is no longer physically capable of working all his land, his farming system may contract to the point where he works just his kitchen garden and supplies his household with only their immediate needs. This 'life cycle' does not explain the existence of all non-commercial holdings, for some are static units, whose occupier supplies part or all of the fruit and vegetables consumed by the household and has no intention of selling his produce. It is important, however, to realise that all small

farms, including miniature estates, have a non-commercial aspect, so that much of the following discussion is also applicable to other farming categories.

The spatial and proportional distribution of non-commercial holdings

Non-commercial holdings are distributed throughout the island and show no distinct spatial pattern within the sample except for a minor concentration around St George's Town (Fig. 13). Differences in the proportion of non-commercial holdings in the total sample of each parish are slight, unlike those of the other farm categories, and range from 10.4 per cent in St David's to 18.5 per cent in St George's (Table 7.1). As St George's parish shows a relationship between non-commercial farmers and non-manual workers, a similar relationship was expected to exist in St David's, the parish with the highest proportion of non-manual workers, 17 per cent. That this is not the case is due to the fact that farmers having non-manual occupations in St David's obtain some income from their land and are therefore classified as semi-commercial. Accordingly, St David's parish has the largest proportion of semi-commercial farmers.

Social and economic characteristics

In the following sections consideration is given to occupation, education, religion, race and household structure, as the salient social factors influencing agriculture, and to levels of living as measures of economic motivation and achievement (Chap. 5). The character of the non-commercial landholder is not readily generalised

since their social and economic attributes are so diverse, that age, level of education and social status represent extremes in the sample. Field observations confirm this diversity in the working and organisation of their garden plots.

Occupations

The social character of non-commercial farmers is quickly evaluated by examination of their occupational grouping (Table 7.2) which is characterised by a dominance of low-status occupations, namely estate workers and unskilled labourers, which jointly account for 58 per cent of these farmers. Such workers possess few if any skills and have positions with no responsibility, many are therefore unenterprising individuals.

TABLE 7.2 NON-COMMERCIAL FARMERS: OCCUPATIONAL GROUPINGS

Parish	Number of farmers	Occupational group							
		Estate worker	Unksilled labourer	Skilled labourer	Fisherman	Service industry	Civil service	Professional	Not applicable
St George's	10	1	4	2	-	1	-	-	2
St John's	7	4	2	-	-	-	-	1	-
St Mark's	3	3	-	-	-	-	-	-	-
St Patrick's	7	2	1	-	1	-	-	-	3
St Andrew's	10	4	1	-	-	-	-	1	4
St David's	5	-	2	-	-	-	2	-	1
Total	42	14	10	2	1	1	2	2	10
% of all non-commercial farmers	100	34	24	5	2	2	5	5	24

Another major group comprise those with no employment, 24 per cent, and who are supported by pensions or remittances, or are unfit for work. They include a retired estate manager, 2 retired businessmen (one an American), 5 women who often care for grandchildren, and 2 infirm and aged men who are unemployable. The remaining non-commercial farmers include 2 teachers, 2 clerks in the civil service, a store manager, a mason, a carpenter and a fisherman.

A distinction, which is meaningful in agricultural terms, is made by dividing the social structure into two groups, manual and non-manual. Those who are no longer employed are classified by their previous occupational experience. This analysis shows that the manual workers are dominant, accounting for 33, or 78 per cent, of these smallholders.

Education

Educational attainment varies with the occupational groups. The variability is demonstrated by the fact that although the average standard of attainment, 4.9, is higher than the survey mean, 4.3, yet the percentage of those not having reached the first standard, 17 per cent, is higher than the survey norm, 10 per cent. There are wide discrepancies between the parishes, from a low mean of 1.3 in St Mark's to a high figure of 7.6 in St David's, while St John's has more than half its non-commercial smallholders not having reached the first standard (Table 7.3).

Farmers with low levels of education are mostly estate workers and unskilled labourers, none of whom has reached higher than the fifth standard. While these levels may reflect lack of opportunity to attend

school during childhood, either through family poverty or lack of nearby schools, it can also be attributed to a lack of mental ability and ambition to learn; human failings which retard an individual's general progress and limit his achievements in agriculture.

TABLE 7.3 NON-COMMERCIAL FARMERS: EDUCATIONAL ATTAINMENT

Parish	Number of farmers	Mean educational standard	Number of those not reaching 1st standard
St George's	10	6.6	-
St John's	7	3.4	4
St Mark's	3	1.3	1
St Patrick's	7	4.0	-
St Andrew's	10	4.8	2
St David's	5	7.6	-
Total	42	4.95	7
% of all non-commercial farmers	100		17

Occupations overseas

The proportion of non-commercial farmers who have had employment overseas is lower than the sample norm, being 26 per cent as compared with 37 per cent. This lower proportion is attributable to the dominance of estate workers and unskilled labourers in this category. Some of them, however, had worked abroad, usually in Trinidad or other West Indian islands as migrant labourers. Four of the pensioners had retired from positions they had held in the United Kingdom and North America (Table 7.4). It is indicative of a general lack of initiative and

skills that relatively few farmers in this category have had employment overseas.

TABLE 7.4 NON-COMMERCIAL FARMERS: OVERSEAS EMPLOYMENT

Parish	Number of farmers	United Kingdom	North America	Aruba, Curacao	Trinidad	Latin America	Other West Indian islands	Total who worked abroad
St George's	10	1	-	-	-	1	2	2
St John's	7	-	-	-	1	-	-	1
St Mark's	3	1	-	-	1	-	-	1
St Patrick's	7	1	-	1	-	-	2	2
St Andrew's	10	-	2	1	2	-	-	3
St David's	5	-	2	-	1	-	-	2
Total	42	3	4	2	5	1	4	11
% of non-commercial farmers	100	7	10	5	12	2	10	26

Religion

This category of smallholders has a greater proportion of Roman Catholics, 67 per cent (Table 7.5), than the sample norm, 52 per cent. In Chapter 5 members of this church are noted as having the lowest material motivation of all denominations. Consequently, a characteristic of these smallholders is their lack of ambition to work land for maximum gain. Members of this church are mainly estate workers and unskilled labourers who have already been noted as possessing few skills and having low academic standing. Non-manual workers are likely to belong to the Anglican, Methodist and Presbyterian churches and to take a more positive approach to working land.

TABLE 7.5 NON-COMMERCIAL FARMERS: CLASSIFICATION BY RELIGIOUS DENOMINATION

Parish	Number of farmers	Religious denomination: Roman Catholic	Anglican	Methodist	Presbyterian	Seventh Day Adventist	Others
St George's	10	5	3	1	-	-	1
St John's	7	4	1	-	-	1	1
St Mark's	3	3	-	-	-	-	-
St Patrick's	7	5	-	-	1	1	-
St Andrew's	10	8	1	-	-	-	1
St David's	5	3	1	-	1	-	-
Total	42	28	6	1	2	2	3
% of all non-commercial farmers	100	67	15	2	5	5	6

Race

The distribution of these farmers by racial groups resembles the survey norm (compare Table 7.6 with Table 5.17). Negroes are the dominant group and have employment principally on estates and as unskilled workers with the Public Works Department. Coloureds and whites tend to have employment as skilled or non-manual workers, while farmers who have no employment are from all racial groups.

Household structure and character

A feature of these households is the higher proportion of female headships, 31 per cent, in comparison to the sample norm, 17 per cent. St Patrick's parish, notable for its female farmers (supra, p.84) is remarkable in that women head 5 out of 7 households (Table 7.7).

TABLE 7.6 NON-COMMERCIAL FARMERS: CLASSIFICATION BY RACIAL GROUP

Parish	Number of farmers	Number in racial groups			
		Negro	Coloured	East Indian	White
St George's	10	5	3	-	2
St John's	7	5	1	1	-
St Mark's	3	3	-	-	-
St Patrick's	7	6	1	-	-
St Andrew's	10	7	3	-	-
St David's	5	1	3	1	-
Total	42	27	11	2	2
% of all non-commercial farmers	10	64	26	5	5

TABLE 7.7 NON-COMMERCIAL FARMERS: AGE, SEX, AND MARITAL STATUS

Parish	Number of farmers	Age in years	Sex		Marital status			
			Male	Female	Single	Married	Widowed	Separated
St George's	10	48.9	8	2	5	2	1	2
St John's	7	45.3	6	1	1	4	2	-
St Mark's	3	49.3	2	1	1	2	-	-
St Patrick's	7	44.4	2	5	1	4	2	-
St Andrew's	10	49.7	7	3	3	4	1	2
St David's	5	51.6	4	1	2	3	-	-
Total	42	49.3	29	13	13	19	6	4
% of all non-commercial farmers			69	31	31	45	13	10

This affects the nature of agriculture since these women have domestic responsibilities and so devote less time and energy to working their land.

The marital status of these landholders is unstable, and shows a marked difference to the norm of the survey, as less than half are married and almost a third are single (compare Table 7.7 and Table 5.9). This difference reflects the social status of these smallholders, as marriage is noted to be less common and occur later in life among the lower strata of society than it does in the higher status groups.[3] The implications of a stable union by the smallholders have been discussed (supra, p. 86) so that the absence of such a union is considered to result in the farmer taking a more carefree attitude to cultivating his land so that poor farming practices are often adopted.

Non-commercial farmers are on average younger, at 49.3 years, than the sample norm, 53.9. This mean age disguises the fact that 41 per cent of these farmers are under 45 years, but 29 per cent over 64 years. This is a further illustration that non-commercial farmers represent both the birth and death of farming systems.

Levels of living

In no other category of small farmers are extremes in levels of living so evident. At the lowest level is the 18' x 12' two-room dwelling, with rudimentary furniture and no household conveniences, of the typical estate worker, while at the highest level, the spacious home

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3. A detailed account of patterns of marriage in various social groups is found in M.G. Smith, Stratification in Grenada, Chapter 7, 'Mating and Status', and in Clark, op.cit., Chapter 3, 'Marriage'.

complete with most modern conveniences, of a retired businessman. In Table 7.8 the index of occurrence of selected items and services indicates the wide discrepancy between parishes as this index is highest in St George's, .56, and St David's, .42, and lowest in St Patrick's, .12, and St Mark's, .05. St Mark's parish serves to illustrate the poverty that is experienced by estate workers, as in the three homes a single radio was the only item present from the list of criteria considered in determining levels of living.

TABLE 7.8 NON-COMMERCIAL FARMERS: LEVELS OF LIVING AS INDICATED BY POSSESSION OF CONVENIENCES AND GOODS

		Conveniences and goods								
Parish	Number of farms	Electricity	Sewerage	Plumbing	Gas stove	Refrigerator	Radio	Telephone	Motor vehicle	Index of occurrence
St George's	10	6	3	8	8	5	10	2	3	.56
St John's	7	1	1	1	2	-	5	-	-	.18
St Mark's	3	-	-	-	-	-	1	-	-	.05
St Patrick's	7	-	-	2	1	-	2	-	-	.12
St Andrew's	10	1	1	2	4	2	6	-	1	.21
St David's	5	2	1	1	5	1	5	1	1	.42
Total	42	10	6	14	20	8	27	3	5	.28
% of non-commercial farmers	100	24	14	32	48	19	65	7	12	

Summary

While the social and economic background of the non-commercial landholder is diverse, he can be broadly typified as an estate worker or unskilled labourer who has had little formal education. He is about

40 years of age and probably a negro Roman Catholic who may or may not be married. In general he is lacking in security and ambition, leading little more than a traditional life of subsistence farming.

In stark contrast to this group is the minority (about one-fifth) of non-commercial landholders who have, or had, non-manual occupations. They are usually coloured and Protestant. Their educational attainment is much higher than the estate workers' and has enabled them to develop a progressive outlook on life and, with it, a higher level of living.

The agricultural unit

In the previous section a distinction was made between two categories of non-commercial smallholders: those with traditional, and those with progressive attitudes. This distinction is further revealed in their respective approaches to agriculture. To those with manual occupations their garden plot represents an integral part of their way of life, as its produce is necessary for the support of their families because their income is inadequate to purchase all the requisite foodstuffs. As the output from their land is vital to their well-being, these people use crops and techniques of cultivation which through time have proved reliable in meeting immediate demands. Thus, their cultivation is primitive and traditional. For these farmers, risk and uncertainty have a seriously inhibiting effect upon their willingness to innovate, as any failure they experience could mean a serious economic setback and possible starvation, consequently these farmers adopt a conservative attitude to farming.

The incomes of those with non-manual occupations are higher than incomes of manual workers, so that production from their garden plot has less economic significance to their well-being. Thus, their cultivated land is a means of producing quality vegetables, of curbing the higher price demanded for foodstuffs and, possibly, of providing a rewarding form of recreation. Such production is not vital to their livelihood, so that they can afford to experiment with new crops, fertilizers and techniques as their failure does not imply serious repercussions. As a result their methods of cultivation tend to be progressive rather than traditional. This subgroup of non-commercial landholders will subsequently be identified as 'week-end' farmers, since it is on Saturday and Sunday that most are free to work their land. However, included in this group are those who had retired from non-manual jobs and who work their land intermittently throughout the week, but in the same manner as the others.

Although 'week-end' farmers are a minority, they illustrate a more advanced stage of non-commercial farming and indicate lines along which the traditional system can improve.

Characteristics of the land

Non-commercial holdings have an average size of 1.27 acres, with variation between the parishes ranging from 1.05 acres in St David's to 1.53 acres in St George's (Table 7.9). Of these holdings, 71 per cent of the land is in cultivation, with the remainder being in fallow, bush, forest or flower garden. It is indicative of the estate worker's need to work his garden plot that St Mark's parish has the

TABLE 7.9 NON-COMMERCIAL FARMS: CHARACTERISTICS OF THE FARMS

Parish	Number of farms	Characteristics: Mean number of fragments	Mean size of farm (acres)	Mean size of cultivated land (acres)	% cultivated land of total land
St George's	10	1.7	1.53	1.16	76
St John's	7	1.7	1.23	.79	64
St Mark's	3	2.0	1.17	1.00	85
St Patrick's	7	1.1	1.25	.91	73
St Andrew's	10	1.9	1.24	.74	60
St David's	5	1.4	1.05	.72	69
Total	42	1.64	1.27	.90	71

highest proportion, 85 per cent, of land in cultivation. In other parishes, however, where non-manual workers represent a major proportion of the sample, the percentage of land in cultivation is not correspondingly high, suggesting either that some land had recently been acquired and was not yet fully cultivated or that aged farmers had abandoned part of their property.

These holdings consist on average of 1.64 fragments. Of these holdings, 19 have a single fragment, 17 have two and 6 have three. Those with more than one fragment usually have less than half an acre of cultivation on their housespot and consequently cultivate a fragment elsewhere. Again the example of non-commercial farmers in St Mark's is representative of estate workers in general. Each has a housespot and two out of three an additional fragment which they rent at a nominal

fee from the estates on which they are employed.

The pattern of tenure does differ from that previously described (compare Table 7.10 with Table 6.3) in that a smaller proportion of fragments is owned, 64 per cent, and a higher proportion held in trusteeship or are provision grounds on estate land, 17 per cent. This difference is attributable to the poverty of estate workers and unskilled labourers who lack the capital to purchase land other than their housespot. However, most of the land occupied by non-commercial farmers is owned with the incidence of ownership being higher among non-manual workers.

Distinctions could not be made between 'week-end' farmers and the others in respect of fragmentation, size of holding or the amount of land in cultivation. A difference exists, however, between those actively employed and those in old age who are either in ill-health or infirm. The latter own more land than the former, but work a smaller proportion of it. Such holdings are often the remains of former semi-commercial farms.

Components of the non-commercial farms

In this thesis a distinction has been made between the kitchen garden and provision ground (supra, p.122). Non-commercial farms always consist of the former and usually the latter. The kitchen garden is regarded as that piece of land in the immediate vicinity of the home which is devoted principally to the cultivation of food crops for consumption by members of the household. Where similar crops are found on fragments other than that on which the situated, i.e., fragments

TABLE 7.10 PAROCHIAL DISTRIBUTION OF FRAGMENTS BY TYPE OF FARM AND TENURE CATEGORIES, BY PARISHES

	Tenure category	Types of farm: Non-commercial	Semi-commercial	Commercial	Miniature estate
St George's	O	12	21	44	12
	R	4	4	6	1
	S	-	4	4	2
	X	1	4	1	1
St John's	O	8	9	24	22
	R	1	5	22	1
	S	-	-	1	-
	X	3	1	1	-
St Mark's	O	2	12	7	17
	R	3	1	3	2
	S	-	-	-	-
	X	-	-	2	3
St Patrick's	O	7	21	36	16
	R	2	7	7	2
	S	-	1	-	-
	X	1	4	1	-
St Andrew's	O	9	47	87	12
	R	3	5	12	3
	S	-	-	-	-
	X	6	10	5	2
St David's	O	6	3	51	12
	R	1	8	5	-
	S	-	1	2	-
	X	-	4	4	-
Total	O	44 (64)	141 (71)	249 (76)	91 (84)
	R	14 (14)	30 (15)	55 (17)	9 (8)
	S	-	6 (3)	7 (2)	2 (2)
	X	11 (16)	23 (11)	14 (4)	6 (6)

Numbers in brackets are percentages

O = Ownership
R = Rent
S = Share-cropping
X = Other (estate, trusteeship)

numbered two and over, that area is referred to as a provision ground. This name does not imply that cultivation is limited solely to ground provisions (the local name for root crops) although this is often the case.

In this section discussion is focused on the traditional kitchen garden as found on 79 per cent of these holdings. A brief description of the kitchen gardens of 'week-end' farmers follows to illustrate the difference in methods of cultivation. The discussion concludes with mention of the provision grounds.

The traditional kitchen garden

At first sight the traditional kitchen garden can give the impression of congested and confused growth rather than one of purposeful cultivation. Kingsley (1872) remarked that it was a disappointment to him not to recognise in nine cases out of ten these areas of 'petite culture'.[4] He was unprepared for such a density of crops growing in a confined space. Today, the same characteristics prevail. An appreciation of the principles of kitchen gardening, however, is gained by acquaintance with these crops, their growing season, physical requirements and nutritional qualities.[5] It is then realised that this system of cultivation is not as haphazard as it may appear, although it still represents a low order of cultivation.

It is the function of the kitchen garden to produce a year-round supply of fruits and vegetables for the household. As the local diet has

4. C. Kingsley, At Last, A Christmas in the West Indies, London, 1872, p.372.

5. A detailed description of this aspect of kitchen gardens appears in D.Q. Innes, 'The Efficiency of Jamaican Peasant Land Use', The Canadian Geographer, Vol. 5, No. 2, 1961.

a starchy base, the principal crops are ground provisions, breadfruit, plantains and bluggoes. To ensure a continuous supply, the farmer grows a variety of similar crops with different growing periods. For example, tannias and yams have growing seasons of 6 to 8 months and 9 to 12 months respectively; they also have different storage qualities. Thus, by careful staggering of the planting season, one crop can augment the other for much of the year. Likewise, an almost continuous supply of peas, beans or corn, and fruits of the banana family can be obtained. This supply is not a problem in areas where rainfall exceeds four inches in any month,[6] e.g. Annandale, since the period of drought is insufficient to restrict crop growth. However, such humid locations do not provide optimum conditions for pigeon peas, corn and cassava, although they do permit most temperate root crops and green-leaf vegetables to be grown throughout the year.

Kitchen gardens are frequently delimited by food trees on property boundaries. An imposing coconut, breadfruit or mango tree might indicate the corner, while less conspicuous trees might mark the property line. Within these confines other food trees are found, their haphazard distribution suggesting accidental propagation (Fig. 14). On holdings where the rainfall exceeds 80 inches in a year, food trees could be so numerous and luxuriant that they provide an almost continuous canopy over the lower crops.

The focal point of the kitchen garden is invariably the housespot. This location is on the most accessible piece of level land, and is consequently surrounded by some land suited to cultivation. Around

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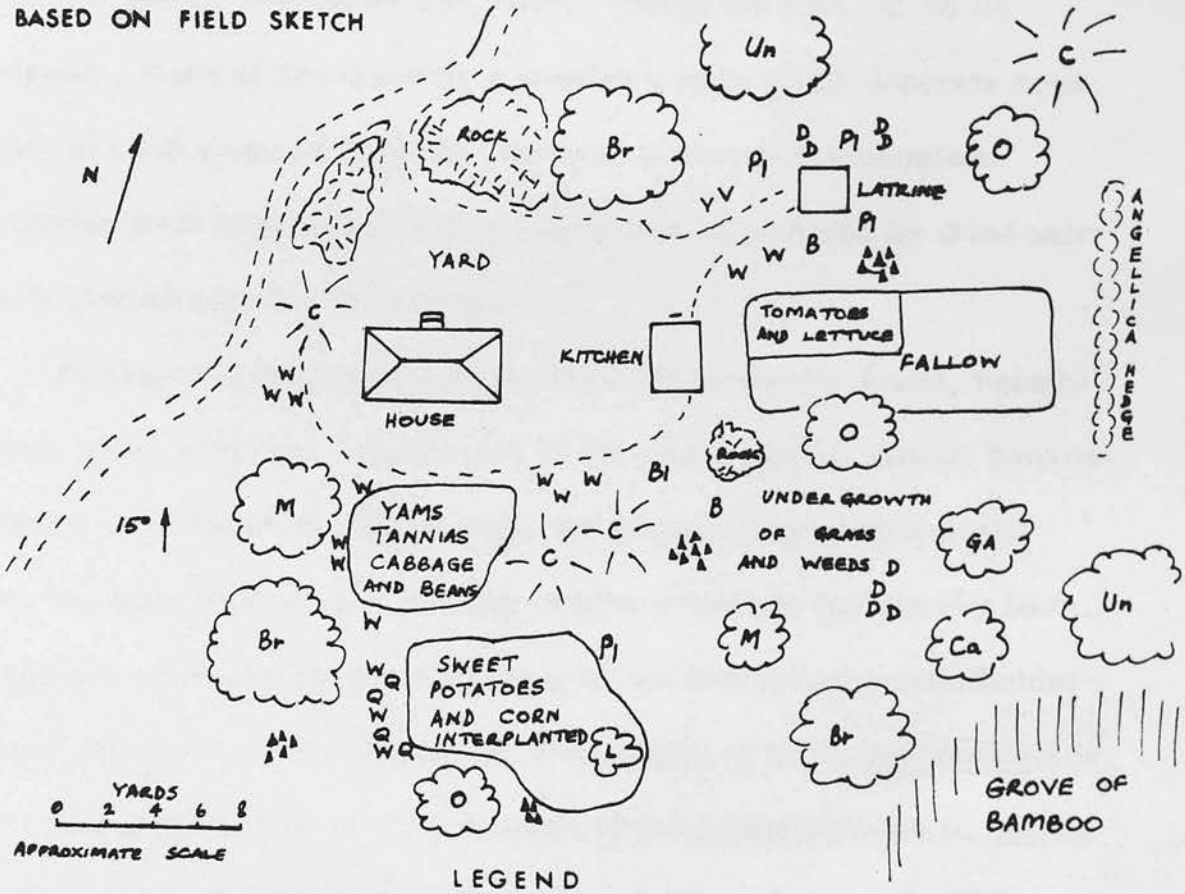
6. A figure supplied by an agricultural official and supported by field study.

Plan of kitchen garden, near Concord, St. John's

BASED ON FIELD SKETCH



LEGEND

Individual Beds
Path
Extent of foliage
Pile of Stones
Rock Outcropping

B	Banana	M	Mango
Bl	Bluggo	O	Orange
Br	Breadfruit	Pl	Plantain
C	Coconut	Q	French Bean
Ca	Cashew	V	Pepper
D	Dasheen	W	Pigeon Pea
GA	Golden Apple	Un	Unidentified

FIGURE 14

the actual house there is a yard of bare earth, packed firm by the constant movement of man and beast. Within this yard, and some distance from the house is a shed, often a ramshackle construction, which is the kitchen. This is separate from the house, as kitchen fires originating from the open charcoal hearth are common. It also serves as a store house for ground provisions and tools. Within the yard, or on its periphery, there is occasionally a wooden trestle which supports seed boxes of such crops as cabbage, lettuce, tomato and melongene. Protection from intense sunlight or heavy rain is provided by dried palm fronds placed over the seed boxes.

Beyond this bare ground three crops are commonly found, namely pigeon peas, calialou[7] and species of the genus Musa, usually bananas, plantain and bluggoes. These crops are frequent ingredients in the diet, the peas and calialou serving to give variety to the starchy base. By using a system of continuous planting and harvest, the smallholder assures himself of a small, but regular, supply of fruits and vegetables.

The organisation of the remainder of the kitchen garden is largely determined by physical restraints, either of size, shape or fertility, and by the personal preferences of the farmer. Where land is in slope category E or F, food trees and/or grass are often cultivated, while on gentler slopes vegetables are grown in a variety of ways. Figures 14 and 15 illustrate the distribution of crops on two kitchen gardens of non-commercial holdings. The actual arrangement of crops may be influenced by traditional beliefs. For example, the pattern of land-use employed by an ancestor can determine the nature of crops grown on a

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7. The heart-shaped leaf of the dasheen, which when cooked is similar to spinach and is used in comparable ways.

Plan of non-commercial farm in Tivoli, St. Andrew's

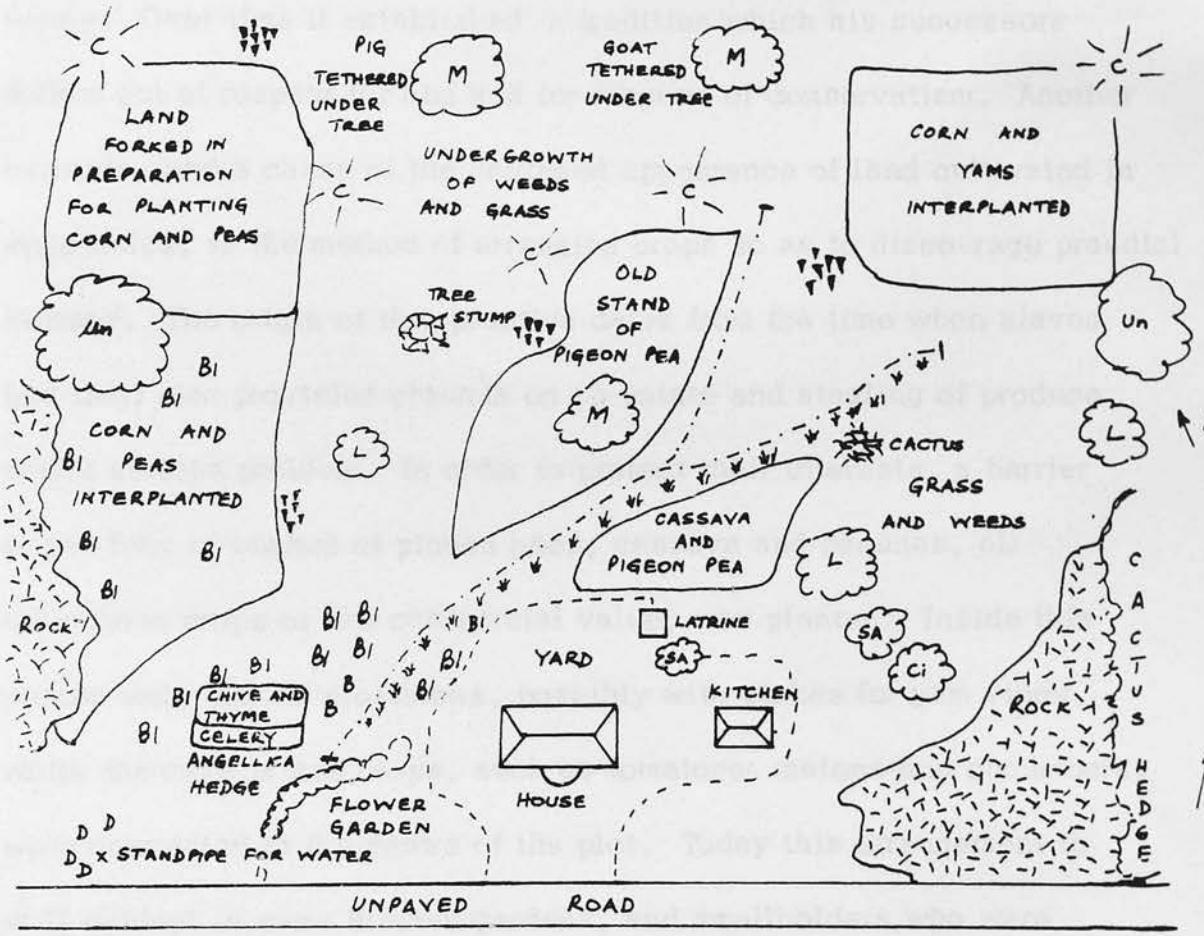


FIGURE 15

particular piece of ground, for where he found that a particular crop, or combination of crops, giving exceptionally good yields in a given place, he persisted with this use expecting similar results in the future. Over time it established a tradition which his successors follow out of respect for him and for reasons of conservatism. Another example, and a cause of the confused appearance of land cultivated in vegetables, is the method of arranging crops so as to discourage praedial larceny. The origin of this practice dates from the time when slaves had their own provision grounds on an estate and stealing of produce was a serious problem. In order to protect their interests, a barrier in the form of bushes of pigeon peas, cassava and bananas, all ubiquitous crops of low commercial value, was planted. Inside this screen were ground provisions, possibly with stakes for yam vines, while the more prized crops, such as tomatoes, melons and cucumbers, were concealed at the centre of the plot. Today this arrangement is still evident in some kitchen gardens, and smallholders who were questioned about it replied that it was a traditional practice that they assumed was necessary for the optimum growth of their crops. One respondent, however, remarked that he did it for aesthetic reasons!

Another cause for the confused appearance of kitchen gardens and provision grounds is the practice of inter-cropping various vegetables, for example, the planting of tannias and French beans in the same hole. This combination has some merit, as the bean will produce and be harvested in 6 to 8 weeks, while the tannia takes as many months; in the meantime the leguminous crop adds nitrogen to the soil and provides cover against erosion. Other crop combinations frequently noted for

interplanting are those of French beans and corn, corn and yams (where the corn stalk serves as a stake about which the yam vine will climb) and cow peas, corn and tannias, all these planted in the same hole. While this practice permits intensive use of the land, it is not advocated by the island's Department of Agriculture, which argues that it is inefficient because it is difficult to apply the correct amount or type of fertilizer, as the requirement for one crop differs from that of another, or to control disease by the spraying of crops where again the needs differ. Other criticisms of the method are that where the first crop matures it can prevent the second crop from receiving adequate light, and that soil around the second crop can be compacted by trampling while the first crop is harvested, thus restricting growth.

A variation of intercropping is the planting of alternate rows of crops, such as yams and tannias, with the former in ridges and the latter in furrows. Although this is a better technique of interplanting, as it is more orderly, it is still subject to the same criticism by the Department of Agriculture. Still intercropping remains a feature of vegetable gardening as it has proved itself through time and to change is to invite uncertainty and risk.

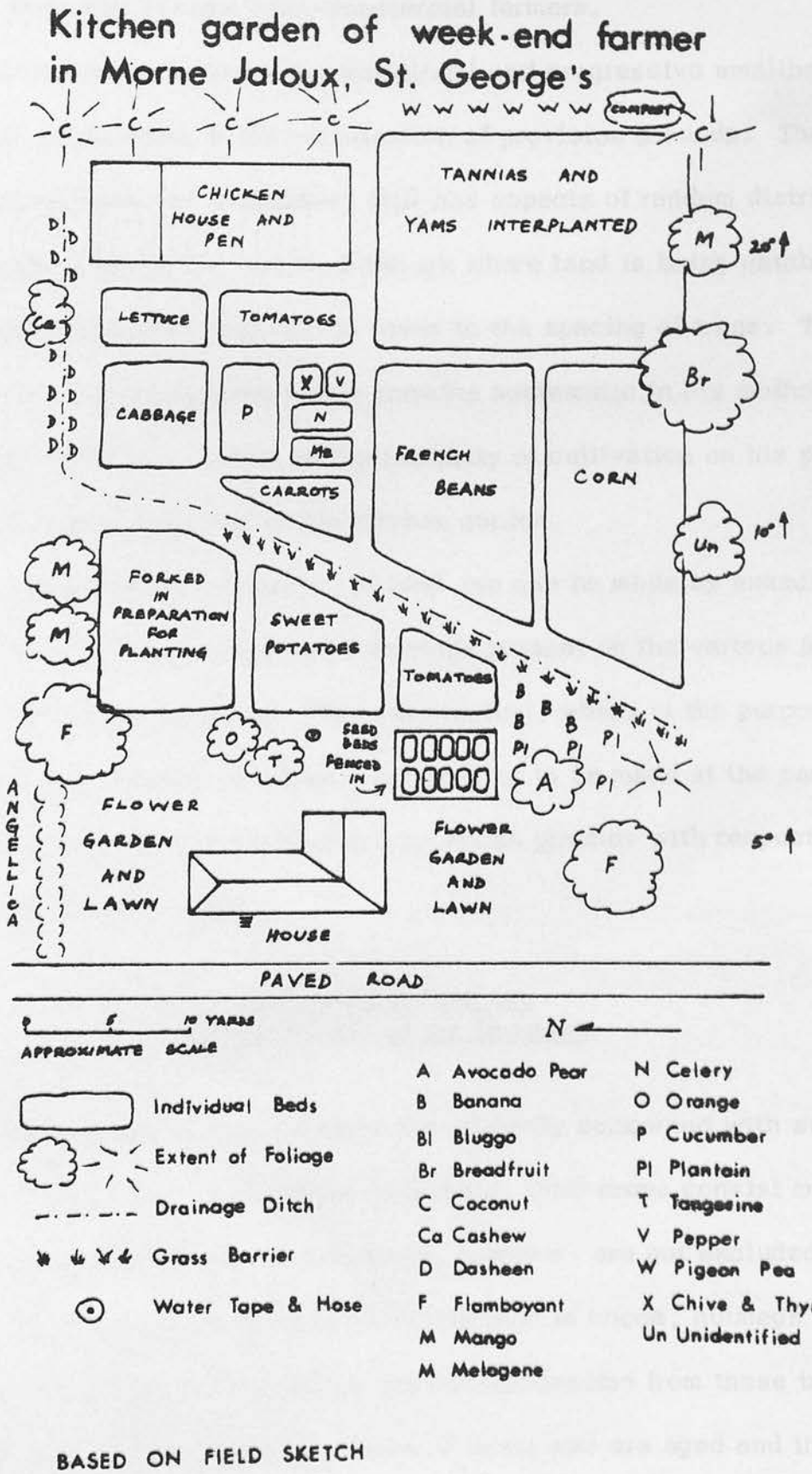
The total area of some of these kitchen gardens is subjected to land rotation. About one-quarter of the land may be rested at any one time after it has grown vegetables. For a year, or even two, this land is left to recoup its nutrients, with the remnants of the last cultivated crop remaining on the surface to decay and protect the soil from erosion during the wet season.

The kitchen garden of the 'week-end' farmer

In contrast to the organisation of land use on the traditional kitchen garden is the kitchen garden of the 'week-end' farmer. With its clearly defined beds of single crops its appearance closely resembles that of a European or North American garden plot. Generally the organisation of the land is systematic with no sense of crowding or confusion conveyed to the observer. Around the house, grass and flowers commonly replace the yard of bare earth. Food trees, while still planted along property lines, are not scattered indeterminately throughout the rest of the kitchen garden, and are grouped in clusters, more uniformly spaced and on land unsuited or unnecessary for vegetable growing. Interplanting of different crops is uncommon and then usually only between yams, dasheen and tannias. Stakes are erected for the vines of sweet potatoes and yams to climb, and for the support of tomato plants. (See Fig. 16 for the plans of a typical 'week-end' farmer in Morne Jaloux, St George's parish.)

Provision grounds

Provision grounds are present on 23, or 55 per cent, of the non-commercial holdings. In general, land use is less intensive and crops less diversified than on the kitchen gardens. Trees are usually the dominating feature, with the area devoted to vegetables often being relatively small. Those vegetables which are cultivated here, such as ground provisions and pigeon peas, have a low commercial value and require little attention. Some of the provision grounds are in a state of transition and in the future will become fragments producing export crops. Thirteen non-manual workers and 2 non-manual workers are



BASED ON FIELD SKETCH

FIGURE 16

establishing this land in cocoa, nutmegs or bananas, so that when their trees begin to declare their fruit, and regular sale of their produce is made, they will become semi-commercial farmers.

Differences between the traditional and progressive smallholders are still pronounced in the organisation of provision grounds. The planting of trees and vegetables still has aspects of random distribution in the case of the former, although where land is being established in export crops more attention is given to the spacing of trees. The 'week-end' or progressive farmer remains systematic in his methods although there is a decline in the intensity of cultivation on his provision ground as compared to his kitchen garden.

A quantitative evaluation of land use can be made by examination of the types of vegetables and tree crops present on the various fragments within the parishes. This examination, which is the purport of the following section, enables a comparison to be made at the parish level between kitchen gardens and provision grounds with respect to the distribution of crops.

Evaluation of land use by the number of the fragment

As non-commercial holdings are primarily concerned with supplying the basic daily needs of the household, their crops consist mainly of vegetables and fruit. Export crops, however, are not excluded since a few of these farmers were establishing land in cocoa, nutmegs or bananas, but they did not derive any notable income from these trees at the time of their interview. Some of those who are aged and infirm

are unable, or could not be bothered, to collect the fruit of these trees and have abandoned them.

Vegetables

On both the kitchen garden and the provision ground a large number of vegetables of both temperate and tropical origins is cultivated. In the survey no attempt was made to obtain actual figures or even estimates of the number of plants or acreage occupied by a given crop; only their occurrence was noted.

The variety of vegetables grown and the index of their occurrence on various fragments for each parish are shown in Table 7.11. This index of occurrence for Fragment 1, the kitchen garden, .22, is higher than on Fragments 2 or 3, .14 and .02 respectively, and indicates that variability and frequency of crop occurrence decrease with fragment number. Each parish follows this pattern, but none more strikingly than St Mark's where Fragment 1, F1, has an index of .25, and fragment 2, F2,[8] has a corresponding figure of .07.

The crops most commonly found on the kitchen garden are, in descending order, pigeon peas, dasheen, yams, and tannias, which are all present on half or more of the kitchen gardens; and corn, tomatoes, and okra, which are present on one-third. On the provision grounds, tannias, pigeon peas, corn and yams are the only crops present on one-third of these fragments.

A measure of the difference in the character of the kitchen gardens in the parishes is indicated by their indices of occurrence, where the

8. Notation, Fn, where 'F' indicates fragment and 'n' its number, is used hereafter.

TABLE 7.11 NON-COMMERCIAL FARMS: VEGETABLE CROP OCCURRENCE

Parish	Fragment number	Number of fragments	Tropical roots & tubers							Temperate roots				Green leaf		
					Ground provisions											
			Arrowroot	Cassava	Dasheen	Eddoes	Sweet potatoes	Tannias	Yams	Beetroot	Carrots	Onions	Radishes	Cabbages	Celery	Lettuce
St George's	1	10	-	2	6	2	9	5	6	-	3	-	-	4	3	4
	2	6	-	1	2	1	3	2	3	1	1	1	-	2	-	1
	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St John's	1	7	-	1	4	-	3	5	3	-	-	-	-	-	-	1
	2	4	-	-	-	-	-	1	2	-	-	-	-	-	-	-
	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St Mark's	1	3	-	1	1	1	1	3	2	-	-	-	-	-	-	-
	2	2	-	-	-	-	1	-	1	-	-	-	-	-	-	-
St Patrick's	1	7	-	3	2	-	-	2	3	-	-	-	-	-	-	3
	2	3	-	1	1	-	-	1	1	-	-	-	-	-	-	-
St Andrew's	1	10	-	1	6	-	-	3	4	-	-	-	-	-	-	2
	2	6	-	-	1	-	-	4	2	-	-	-	-	-	-	-
	3	3	-	-	-	-	-	1	-	-	-	-	-	-	-	-
St David's	1	5	-	-	3	-	3	3	4	-	-	-	-	1	-	3
	2	2	-	1	-	-	1	-	-	-	-	-	-	1	-	-
Total	1	42	-	8	22	3	9	21	22	-	3	-	-	5	-	13
	2	23	-	2	4	1	5	13	9	1	1	1	-	3	-	1
	3	6	-	-	-	-	-	1	-	-	-	-	-	-	-	-

TABLE 7.11

Parish	Fruit and pod											Others		Index of occurrence	Number of different crops
	Corn	Cow peas	Cucumbers	French beans	Groundnuts	Melogene	Okra	Peppers	Pigeon peas	Pumpkins and melons	Tomatoes	Seasoning*	Sugar cane		
St George's	4	1	4	5	1	3	4	3	6	1	6	2	-	.29	22
	3	-	2	2	-	-	1	-	4	1	2	1	1	.22	20
	-	-	-	-	-	-	-	-	-	-	-	-	-	.00	-
St John's	3	1	1	1	-	-	4	1	5	-	2	1	-	.19	15
	-	-	-	-	-	-	-	-	1	-	-	-	-	.03	3
	-	-	-	-	-	-	-	-	-	-	-	-	-	.00	-
St Mark's	2	-	-	1	1	-	2	1	2	-	-	-	-	.22	12
	2	-	-	-	-	1	-	-	2	-	-	-	-	.13	5
St Patrick's	3	-	-	3	-	1	2	-	5	-	3	1	-	.16	12
	1	1	1	1	-	-	1	-	1	-	-	-	1	.14	11
St Andrew's	4	1	1	1	-	-	-	2	7	-	3	1	-	.13	13
	3	-	-	-	-	-	-	-	3	-	-	-	-	.08	5
	-	1	1	-	-	-	-	-	1	-	-	-	-	.01	4
St David's	4	-	1	-	-	1	3	2	5	-	3	1	1	.25	15
	1	-	-	-	1	-	-	-	1	-	1	1	-	.07	8
Total	20	3	7	11	2	5	15	9	30	1	17	6	1	.22	23
	10	1	3	3	1	1	2	-	12	1	3	2	2	.14	23
	-	1	1	-	-	-	-	-	1	-	-	-	-	.02	4

* Principally chives and thyme

highest was in St George's, .29, and the lowest in St Andrew's, .13. This difference reflects the greater variety of crops grown in St George's parish, where 22 out of a possible 27 crops are present. No other parish has more than 15. This diversity is explained not only by variety of soils and climate, but also by the presence of a society whose higher level of education has given rise to more developed tastes. This consideration also explains why St David's parish has the second highest index, .25.

It is the presence of 'week-end' farmers in both these parishes which accounts for the diversity of crops, as they, and not the estate workers or unskilled labourers, cultivate such crops as beets, carrots, onions, celery, chives and thyme. The variety of vegetables found on non-commercial holdings in St Mark's parish is typical of crops grown by estate workers (Table 7.11).

The provision grounds of F2 and F3 have a smaller number and variety of vegetables, usually ground provisions, which correspondingly give lower indices of occurrence than F1 (Table 7.10). Only F2 in St George's parish is noteworthy for its high index, .22, a value which indicates the farmer's preparedness to visit this fragment regularly and to cultivate crops which require more attention than ground provisions. This fact is seen as a reflection of the proximity of this fragment to the housespot (Table 6.7) which enables supervision to be kept over it.

Tree crops

Crop-bearing trees are a dominant feature of most kitchen gardens and provision grounds as is indicated by their indices of occurrence

(Table 7.12). The differences between indices of occurrence of tree crops do not show as great a degree of selective land use as was the case with vegetables, for although F1 has the highest index, .41, there is no difference between those for F2 and F3, .28 and .29 respectively (Table 7.12). This pattern is not, however, reflected in the parishes, for in St Andrew's F3 has a higher index, .46, than F1, .28.

The highest index of tree crops for kitchen gardens is that of .49 for St Patrick's parish. It is thought that this high index is due to female heads of households finding it easier to cultivate tree crops than vegetables, since they are less demanding on their time. St George's and St David's parishes also have high indices due to their higher proportion of 'week-end' farmers growing a variety of trees. The banana is the most common tree and is found on 38 out of 42 fragments. Coconut, breadfruit, mango and cocoa are also found in more than half the kitchen gardens. The more prized fruit trees, such as grapefruit, pawpaw, and avocado pear, where present on a farm, are usually found in the kitchen garden as a precaution against their being stolen.

On F2 and F3 there is considerably less variety of trees, although the emphasis remains similar to F1 (Table 7.12).

Differences between traditional and progressive non-commercial farms with respect to tree crops are those of variety and quality. 'Week-end' farmers are likely to have choice fruit trees, such as the Julie and Ceylon mangoes, pawpaws, avocado pears, dessert bananas (locally known as silk 'figs') and grapefruit, but few if any have cocoa or nutmeg trees. Manual workers generally have less variety and poorer quality fruit trees due to non-selective propagation. Should they have

TABLE 7.12 NON-COMMERCIAL FARMS: TREE CROP OCCURRENCE

Parish	Fragment no.	No. of fragments	Avocado pear	Bananas	Breadfruit	Cocoa	Coconut	Lime	Other citrus	Mango	Nutmegs	Sapodilla	Other fruits	Index of occurrence
St George's	1	10	4	10	6	3	8	2	5	7	2	-	4	.46
	2	6	-	3	3	2	6	-	1	4	1	1	1	.33
	3	1	-	1	-	-	-	-	-	-	-	-	-	.02
St John's	1	7	1	6	3	4	4	3	3	3	3	-	1	.39
	2	4	-	3	1	3	2	-	-	1	1	-	1	.19
	3	1	1	-	1	-	-	1	-	1	-	-	-	
St Mark's	1	3	1	3	2	1	2	-	-	-	-	-	-	.24
	2	2	1	-	-	-	1	-	1	1	-	-	-	.19
St Patrick's	1	7	3	6	3	6	5	3	4	4	2	-	2	.49
	2	3	1	-	-	1	2	-	1	-	-	-	-	.16
St Andrew's	1	10	-	9	6	5	4	-	3	6	5	-	-	.38
	2	6	1	3	2	2	2	-	2	1	4	-	-	.26
	3	3	1	3	3	2	2	-	1	1	2	-	-	.46
St David's	1	5	1	4	4	3	3	1	1	3	2	1	2	.45
	2	2	-	2	1	1	2	-	1	2	1	-	-	.45
Total	1	42	10	38	24	22	26	9	16	23	14	1	9	.41
	2	23	3	11	7	9	15	-	6	9	7	1	2	.28
	3	6	2	4	4	2	2	1	1	2	2	-	-	.29

(1) 'Bananas' include Plantains and Bluggoes.

(2) 'Breadfruit' includes Breadnut

(3) 'Other Citrus' includes Oranges, Grapefruit and Tangerines

(4) 'Other Fruits' include Soursop, Pawpaws and Custard Apple

cocoa and nutmeg trees, then they are either the basis of future export crop production or the remnants of a former commercial holding which the farmer is no longer capable of working.

Livestock

The least important aspect of production on non-commercial holdings is livestock, which are kept primarily for meat, with eggs and milk a secondary consideration. Animals usually receive no more attention than do vegetables in the traditional kitchen garden. Thus, their quality and management are poor.

The type, number and distribution of livestock on non-commercial farms are shown in Table 7.13. Fowls clearly have the greatest distribution as they are present on 34, or 81 per cent, of the holdings. They mostly consist of 'native' fowl, a kind which is identified by an absence of feathers around its neck. Although neither a good layer nor a good meat bird, it requires less attention and has a greater resistance to disease than other breeds and therefore is well suited to the needs of most small farmers. Only in the vicinity of St George's Town are specialized breeds, such as White Leghorn and Rhode Island Reds, kept by 'week-end' farmers who are conscious of quality. Pigs, goats and sheep, although found on a much lower proportion of these holdings (Table 7.13), are nevertheless, of poor stock. While pigs are normally kept in the kitchen garden and fed on kitchen waste, goats and sheep are tethered during the day on other fragments, on grassy roadside verges or with permission on estate land. Cattle, despite representing a greater investment, scarcely receive more attention than

TABLE 7.13 NON-COMMERCIAL FARMS: NUMBER AND DISTRIBUTION OF LIVESTOCK

Parish	Fowls/household	Dairy cattle	Beef cattle	Milch goats	Meat goats	Pigs	Sheep	Draught donkeys	Manure donkeys
				Number of livestock					
St George's	10.8	2	1	-	2	6	6	-	1
St John's	7.6	2	4	-	2	-	-	-	-
St Mark's	6.3	1	1	-	3	3	1	-	-
St Patrick's	6.1	2	1	6	5	5	4	-	1
St Andrew's	6.9	1	2	1	2	4	-	-	-
St David's	5.6	-	1	-	-	3	2	-	-
Total	7.3	8	10	7	14	21	13	-	2
Ratio/household		.19	.24	.16	.34	.50	.31	-	.05
				Number of holdings with livestock					
St George's	8	1	1	-	2	2	4	-	1
St John's	5	1	2	-	1	-	-	-	-
St Mark's	2	1	1	-	1	2	1	-	-
St Patrick's	6	2	1	2	3	4	2	-	1
St Andrew's	10	1	1	1	2	3	-	-	-
St David's	3	-	1	-	-	3	1	-	-
Total	34	6	7	3	9	14	8	-	2
Percentage of non-commercial farms	81	14	17	7	21	33	19	-	5

than other animals. Most cattle are of the 'native' or 'bush' variety and contain traces of Jamaica Red Poll, Holstein, Aberdeen Angus or Brahman, but lack the specialised qualities of these breeds. Small farmers generally demonstrate no knowledge of improving pasture or of controlling grazing. The donkey is the least common animal on this category of farm, mainly because the uses for which the animal is kept, such as the production of manure and as a means of transport, are not present on a scale which justifies its maintenance.

At the parish level the distribution of livestock is relatively most important in St Patrick's and least in St David's. This variation is again seen as a consequence of female heads of households in St Patrick's finding that livestock suits their farming system, while in St David's it is the tendency by non-manual workers and the aged not to keep livestock (Table 7.13).

Other farm characteristics

Against the background of the components of non-commercial holdings a greater understanding of this category of farms is obtained by considering the acquisition of farming knowledge, the practices of fertilizing and mulching, the input of labour and the distribution of tools. These are all further indices of the level of farming practice, the evaluation of which is an important part of this study.

Farming knowledge

Traditional sources (supra, p. 79) are most frequently acknowledged as the means by which non-commercial farmers learned about agriculture. It is mostly manual workers who comprise the 31, or 74

per cent, of those acquiring their farming knowledge in this way, although four 'week-end' farmers had learned some of their progressive methods of cultivation from their parents. The other major source of farming knowledge is the MacDonald's Farmers' Almanac (supra, p. 80) which is adhered to by 30, 71 per cent, of these farmers irrespective of educational attainment. Those not following this almanac include the more educated farmers, such as a school-teacher, a retired American and an electrician, and also five estate workers and four unskilled labourers who appeared to be ignorant of the concept of the phase of the moon influencing agricultural activity. An illustration of conviction in the moon cycle is given by a retired and educated farmer, who had 30 years experience managing estates, and believed in the moon phase to the extent of pruning and picking his roses by it.

Of the other sources, 20 farmers mention learning from friends and neighbours, while 8 estate workers recognised their occupation as contributing to their knowledge of cultivating export crops. The influence of the extension service is small, as only 5, all 'week-end', farmers, named extension instructors as a source of knowledge. It is unfortunate that these instructors do not communicate with and influence those non-commercial farmers who are manual workers, as some of them are future commercial farmers and in need of every assistance.

As these sources of farming knowledge are essentially informal and unscientific, so these farms are characterized by inefficient and backward farming methods. Manpower and land are neither exploited to best advantage.

Farming practices

The application of fertilizer and mulch to crops reflects the farmer's source of knowledge and his willingness to invest time, money and labour in his land. Both chemical and organic fertilizers are used on kitchen gardens and provision grounds. Some farmers, although they recognise the value of chemical fertilizers, are unwilling to use them on vegetables, complaining that 'dey dus burn up de ground and de crops' without realizing that such a result was due to improper use and application of these fertilizers. Acceptance of chemical fertilizers is also restricted by the belief, prevalent in all parishes except St George's and St David's, that vegetables grown with them cause coronary thrombosis and other heart complaints. This apocryphal relationship probably results from a coincidence, for information on heart disease became known shortly after the widespread introduction of chemical fertilizers on vegetable crops. However, this assumption did not prevent some of these selfsame farmers from applying chemical fertilizers to export crops. As a rule small farmers preferred to use pen manure for vegetable crops as it helped keep the soil 'cool', thus aiding growth of the plants.

Of these farmers 20, 40 per cent, apply fertilizer and of these 8 use only fertilizer, 5 only pen manure and 7 both types. The most common chemical fertilizer is a general purpose one, known by the number ratio of its chemical composition of nitrogen, phosphate and potassium, 12-8-24. Farmers with estate experience are acquainted with this type of fertilizer, as it has been widely used on all export crops, and they will use it on their land when they can afford it, as is

the case in St Andrew's parish. The estate workers in St Mark's parish are too poor to buy chemical fertilizer, while farmers in St Patrick's are either not sufficiently interested in cultivation or not prosperous enough to use fertilizer (Table 7.14). Because unskilled labourers are unlikely to have experience with chemical fertilizers in the course of their work, they rarely use them. Although 12-8-24 is of benefit to most tree crops, it is not as suitable for vegetables as ammonium sulphate (locally called 'salt') which is a fast acting, short-term fertilizer. It is probably the use of 12-8-24 on vegetables that led to criticism of chemical fertilizers burning these crops. The only non-commercial farmers to use 'salt' on their kitchen gardens and provisions grounds are those who acknowledged the extension instructor as a source of farming knowledge.

TABLE 7.14 NON-COMMERCIAL FARMS: USE OF FERTILIZER AND PRACTICE OF MULCHING

Parish	Number of farms	Type of fertilizer: Chemical only	Manure only	Chemical and manure	Total using fertilizer	Total using mulch
St George's	10	1	3	3	7	7
St John's	5	-	-	-	0	5
St Mark's	3	-	2	-	2	2
St Patrick's	7	-	-	-	0	3
St Andrew's	10	5	1	2	7	6
St David's	5	2	-	2	4	4
Total	42	8	6	7	20	27
% of non-commercial farms	100	19	12	16	48	65

Manure is not as widely used as the distribution of livestock suggests (compare Table 7.14 with Table 7.13) so that much manure is left in areas where the livestock had been tethered. This disregard of available resources is symptomatic of the farmer's general lack of motivation to improve his lot. The example of St Patrick's is particularly striking, as although it has the highest number of livestock per household no manure is used on the land. One female farmer kept a donkey for manure, but this was sold to a neighbouring farmer. It is indicative of the interest of the interest and concern of farmers in St George's parish to produce vegetables of high quality that more than half use pen manure in their kitchen garden.

Mulching of crops is a traditional and necessary practice in Grenada's climate and is therefore followed by more than two-thirds of the farmers (Table 7.14). With compost placed around the roots of tree crops and some vegetables in order to conserve moisture and prevent erosion, plants can withstand the partial drought of the dry season and the torrential showers of the wet season. In all parishes except St Patrick's mulching is undertaken by more than half the farmers.

Rarely do farmers who are prepared to fertilize their crops not practice mulching. Unfortunately the problem with non-commercial farmers is that all too small a proportion employ both these basic agricultural practices on their land, so that generally farming is of a low order.

Tools

Agricultural economists often consider farm tools to be representative of the level of technology practised, the more developed the farm,

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Tools

Agricultural economists often consider farm tools to be representative of the level of technology practised, the more developed the farm,

the more sophisticated its tools. Accepting this premise, possession of tools is then considered as a further indicator of levels of farming.

Where the terrain imposes severe restraints upon the equipment which can be used, versatility and portability become necessary characteristics for most tools. These qualities are found in the cutlass, a tool similar to the machete, which is inexpensive, light and multi-purpose, as it can be used for cutting, weeding, pruning, tilling, sowing and reaping. Only 2 non-commercial farmers did not possess a cutlass, both are in St Andrew's parish, the one being crippled by arthritis and the other having lost his cutlass. Although a cutlass and a sack or basket are the only tools a small farmer takes with him to his kitchen garden, he can have other implements, such as forks and spades, which have more specialized uses. The 'week-end' farmer is likely to have additional tools, such as Dutch and weeding hoes, and it is for this reason that these implements are common in St George's and St David's parishes. The index of occurrence for tools thus shows that non-commercial farmers in these parishes are the best equipped (Table 7.15). This index is related to the level of living in these parishes (Table 7.8) which permits these farmers to purchase these tools, and to their previously noted interest in farming. The remaining parishes, however, show little variation with respect to this index.

Labour

The average non-commercial farmer's input of labour on the non-commercial farms is 7.6 hours per week though it must be remembered that these are rough estimates by smallholders. There are considerable differences in the time spent in working the land, from an invalid who

TABLE 7.15 NON-COMMERCIAL FARMS: DISTRIBUTION OF TOOLS AND THE INDEX OF THEIR OCCURRENCE

Parish	Number of farms	Tools							Index of occurrence
		Dutch hoe	Weeding hoe	Cutlass	Spade	Fork	Sack or basket	Cocoa knife	
St George's	10	5	5	10	7	8	8	2	.64
St John's	7	1	2	7	4	5	4	3	.53
St Mark's	3	2	0	3	2	2	2	1	.57
St Patrick's	5	1	2	7	3	6	7	3	.53
St Andrew's	10	2	3	8	7	7	8	3	.50
St David's	5	3	4	5	3	3	5	3	.74
Total	42	14	16	40	26	31	34	16	.60
% of all non-commercial farms	100	33	38	96	62	71	81	38	-

only supervises the work done by other members of the family, to a retired American who estimates he works at least 20 hours per week. Despite the differences in occupations there is no appreciable variation in the amount of time worked by the traditional and progressive farmers, although the work habits of the manual worker are less disciplined than those of the 'week-end' farmer, since the decision to work a given fragment is often determined more by necessity than by routine. Friday is, however, the time when most estate workers attend to their garden plots; estates have traditionally put aside this day for such work, since Saturday is the major market day on the island. Those who have non-manual employment concentrate their working time into Saturday and/or Sunday. There would be occasions during the week when they might water plants or pick fruit in the kitchen garden. Those who are not employed work intermittently during the week.

Total labour input on the holding is not given by the time spent by the head of the household, as his wife and other members of the family may assist with some tasks. For example, before the start of the wet season, the farmer obtains assistance in planting tannias and ground provisions, he digs the hole while the others plant the 'bits' (sections of root stalk having an 'eye' or bud knot). In the growing season weeding is often done by the wife, and if the farmer is unmarried, then this task may be neglected. Hired labour is uncommon and is engaged usually by female farmers or the aged when strenuous tasks, such as digging, are necessary.

Farming problems

Farming problems identified by the smallholder denote both his needs and his ability to evaluate critically those elements of the social-economic environment which restrain his progress in agriculture and possibly influence his level of farming practice. The nature of these problems differs according to his aims and status, and to the location of his holding.

The most prevalent complaint, one associated with 34, or 81 per cent, of these holdings, is that of the damage and nuisance caused by pests, disease and weeds (Table 7.16). Pests are the principal nuisance, with rats and mongooses the major culprits as they destroy crops, especially yams, sweet potatoes, corn and coconuts, and kill poultry. As a possible carrier of rabies the mongoose is also an everpresent threat to livestock, most of which are not inoculated against it. Less frequently heard complaints about pests concern

TABLE 7.16 NON-COMMERCIAL FARMS: AGRICULTURAL PROBLEMS AS IDENTIFIED BY THE FARMER

Parish	Number of farms	Types of problems: Seasonal lack of labour	Lack of capital and credit	Erosion	Pests, disease and weeds	Praedial larceny	Inadequate water supply	Poor tools
St George's	10	2	3	2	9	3	2	1
St John's	7	2	-	-	7	1	-	2
St Mark's	3	-	1	2	3	-	-	0
St Patrick's	7	1	4	3	6	3	1	2
St Andrew's	10	2	5	-	7	2	-	3
St David's	5	-	2	-	2	2	1	1
Total	42	7	15	7	34	11	4	9
% of non-commercial farmers		17	35	17	80	26	10	21

birds eating pigeon peas and corn, and monkeys consuming and damaging fruit on land located in the mountains.

Crop production is also affected by praedial larceny, a complaint common to 11, 26 per cent, of non-commercial farms. While it is customary for a friend, neighbour or their children to help themselves to an occasional coconut or mango, it is regarded as a problem when this custom is abused by persons unknown to the landowner or in quantities regarded as excessive. The victims are invariably either old people incapable of catching the thief or those with fragments they do not visit regularly. Both farmers and agricultural instructors estimate that between one-tenth and one-third of the total produce from a kitchen garden and provision ground is lost to pests, disease and praedial larceny. This loss of crops serves to deter some farmers from

expanding production; it can also prevent others from adopting more progressive methods of cultivation such as planting a bed with one crop instead of interplanting, which makes the land conspicuous in appearance and invites theft.

Another problem, especially among manual workers wishing to increase their holdings, is the impossibility of acquiring loans because they do not have sufficient collateral. This is the complaint of 15 estate workers and unskilled labourers who are therefore deprived of the opportunity to acquire additional land at a time in life when they are physically fit and ambitious. By the time they have saved sufficient capital from their meagre income in order to purchase their holding, their best working days would be behind them. As about half the manual workers consider the difficulties too great for them to acquire land, mainly because they lack the discipline and determination to save capital, they reject the opportunity to become commercial and independent farmers.

Problems less frequently mentioned are those of seasonal lack of labour, erosion, inadequate water supply and poor roads, the nature of which affects the efficiency and quality of production rather than the loss or increase of such.

Levels of farming

Aspects of the farming system have been examined and variations between the parishes have been indicated, but this has not given a comprehensive index by which levels of farming can be compared between parishes. This is achieved by evaluating each non-commercial

holding as being 'average', 'below average' or 'above average'. By using previous findings as a basis for classification, the 'average' farmer is one who cultivates five or more vegetable crops (as there are five vegetables common to half or more of these holdings) and who has at least a cutlass and either a spade or fork. Consideration is also given to the subjective appraisal of the farmer's efficiency, methods and knowledge as exemplified by his kitchen garden. The state of his vegetable plots is a useful indicator of farming practice, denoting whether the crops are attended or are merely neglected perennials. Smallholders are noted as 'below average' if they fail to meet these requirements. Those who cultivate at least ten vegetable crops, apply fertilizer, and from observation have a systempatic pattern of cultivation in well prepared and tended beds, are classed as 'above average'. This category mostly includes 'week-end' farmers.

The results of this evaluation indicate the higher overall levels of farming in St George's and St David's which between them account for 6 out of the 8 non-commercial farmers who are classed as 'above average' (Table 7.17). This is a not unexpected result as levels of education and living have indicated a more progressive and ambitious type of smallholder in these parishes. Of the remaining parishes, both St John's and St Patrick's are distinguished by having a majority of holdings in the 'below average' category. In the first instance this is attributed to the dominance of poorly educated manual workers, and in the second to the dominance of households headed by females who have consistently been noted for poor farming practices. St Mark's and St Andrew's parishes differ by having a higher proportion of holdings

TABLE 7.17 NON-COMMERCIAL FARMS: EVALUATION OF LEVELS OF FARMING

Parish	No. of farms	Farming levels		
		Below average	Average	Above average
St George's	10	1	5	4
St John's	7	4	2	1
St Mark's	3	1	2	-
St Patrick's	7	4	3	-
St Andrew's	10	4	5	1
St David's	5	1	2	2
Total	42	15	19	8
% of non-commercial farms	100	36	45	19

classed as 'average' than those 'below average'. Of all non-commercial holdings, 45 per cent are 'average', 36 per cent 'below average' and 19 per cent 'above average'. The fact that a greater proportion of farmers have 'below average' than 'above average' levels of farming reflects the dominance of traditional practices over progressive and thereby indicates a generally unsatisfactory condition of non-commercial farms.

Summary

Non-commercial farms consist of a kitchen garden, usually some livestock and on about half the farms a provision ground, which supply an important part of the food required by the farmer's household. Methods of land-use and cultivation vary according to the social and economic background of these farmers. On the one hand is a majority,

about 80 per cent, who are poorly educated and trained, are in manual occupations and follow traditional methods of farming. They are potential semi-commercial and commercial farmers, yet their progress towards such a position is handicapped by backward methods of cultivation and difficulty in acquiring land. About half of these manual workers will become semi-commercial or commercial farmers; the other half are limited by ill-health and by lack of ability and motivation and so will remain non-commercial farmers. On the other hand is the minority who are better educated, are either in non-manual occupations or pensioned, and use progressive methods of working their land. These farmers ironically have no intention of expanding their farming operation to become semi-commercial or commercial farmers because their occupation already provides more status and supposedly higher income than farmers who sell their produce. For the future development of agriculture it is necessary that traditionally-oriented non-commercial farmers adopt the progressive techniques of the 'week-end' farmer, so that should they become semi-commercial or commercial farmers they do not merely employ the same inefficient and unscientific methods on a larger scale. It becomes evident in the next chapter that semi-commercial farmers do, however, represent a higher level of farming.

CHAPTER 8

SEMI-COMMERCIAL FARMERS

Introduction

An important stage in agricultural development is reached when a smallholder relies on a portion of his income being obtained from the sale of farm produce, as it means that sufficient investment of labour and capital has been made whereby crops other than those for domestic use are produced. By so doing the farmer is demonstrating a certain degree of independence, an ambition of most rural folk (supra, p. 75). As semi-commercial farms are frequently a natural development from non-commercial holdings, they consequently have many similar characteristics. A principal difference, however, is that increased investment in land has resulted in semi-commercial farmers taking more interest in agriculture, so that better farming techniques and more efficient land use prevail as compared to those on non-commercial farms.

The semi-commercial category is for most farmers a transition between non-commercial and fully commercial farmers. How long a farmer remains semi-commercial depends upon the profit he makes from his crops as compared to his other sources of income, and/or the availability of land on which he can expand his farming system. He becomes either a commercial farmer when his agricultural income exceeds other income, or an operator of a miniature estate when his land in cultivation exceeds seven acres in size; alternatively, he may return to being

a non-commercial holder if he is no longer physically able to produce crops for sale. This type of farming is, however, characterized more by growth than decay of farm units and it therefore plays an important role in the structure of small farming.

The spatial and proportional distribution of semi-commercial farmers

The distribution of 96 semi-commercial farms shows some distinct patterns (Fig. 13). Around the town of Sauteurs and the village of St David's, and to the south-east of St George's Town, there is some clustering of holdings, an indication of the principal source of employment for these farmers. About other towns, however, there is no such concentration of holdings, as the remaining semi-commercial farms are scattered throughout the sample, although as often as not, they are near the source of regular employment, the estate.

There are differences in the proportion of semi-commercial farmers in each parish (Table 7.1). The smallest representation occurs in St John's parish, where only 18.4 per cent are semi-commercial, with the largest in St David's parish, 41.6 per cent. This variation reflects differences in the availability of both land and employment, as well as the attitudes of small farmers in these parishes to being semi-commercial farmers as distinct from being non-commercial or commercial farmers.

Social and economic characterics

This section follows the same sequence as that established for non-commercial farmers. It emphasises differences both with respect

to the sample norm and to non-commercial farmers, where these reveal aspects about the nature, structure and development of small farming.

Occupations

As many semi-commercial farmers are graduates from the non-commercial category, a comparison between their respective occupational groups provides an indication of the type of individuals who advance in small farming. This comparison (between Tables 7.2 and 8.1) shows semi-commercial farmers to be generally representative of higher income groups, as there is a major increase in the proportion of skilled labourers and those engaged in service industries, mainly at the expense of unskilled labourers and those in the 'not applicable' group.

TABLE 8.1 SEMI-COMMERCIAL FARMERS: OCCUPATIONAL GROUPINGS

		Occupational group							
Parish	Number of farmers	Estate worker	Unskilled labourer	Skilled labourer	Fisherman	Service industry	Civil service	Professional	Not applicable*
St George's	17	4	5	-	-	3	3	-	2
St John's	7	3	1	-	-	1	-	-	2
St Mark's	6	2	-	1	-	1	-	-	-
St Patrick's	16	7	-	4	1	1	-	-	3
St Andrew's	30	14	1	6	1	3	-	1	4
St David's	20	3	3	3	-	5	4	1	1
Total	96	33	10	14	2	14	7	2	14
% of semi-commercial farmers	100	34	10	15	2	15	7	2	15

* Includes those with pensions and private incomes

There are, however, other discreet differences in the occupational nature of these farmers. For example, estate workers, who remain the principal occupational group, accounting for one-third of these farmers, no longer perform just menial tasks on the estate, as was the case in the non-commercial category, but hold positions of some authority and responsibility as one-third are drivers, overseers and in one case an estate manager. To have obtained these positions implies both experience and possession of personal qualities which distinguish them from average estate workers. Similarly, the skilled labour category, which includes an electrician, a garage mechanic and a watch repairer (all of whom had trained abroad), is a more qualified and specialised group than it was for the non-commercial category. The implication is that semi-commercial farmers are, on the whole, a more select group than their non-commercial counterparts.

Education

Although there are wide differences in the levels of educational attainment, these are not as pronounced as in the non-commercial category as is evident from the smaller range in mean educational attainment between the parishes (Table 8.2). Despite the improved occupational background of semi-commercial farmers, their mean level of educational attainment of 4.6 is lower, because the high educational standards of a few non-commercial farmers inflated the mean. This mean level of attainment is above the survey norm of 4.3, as is the proportion of those not reaching the first standard, 17 per cent, to the norm's 10 per cent. Farmers with little or no education are mostly

estate workers, and it is their dominance in the occupational structure of St John's parish which accounts for this parish having the lowest mean level of educational attainment, 2.1. Not all estate workers, however, are poorly educated, as some of those with positions of responsibility have their seventh standard primary school leaving certificate (supra, p. 71).

TABLE 8.2 SEMI-COMMERCIAL FARMERS: EDUCATIONAL ATTAINMENT

Parish	Number of farmers	Mean educational standard	Number of those not reaching 1st standard
St George's	17	4.2	2
St John's	7	2.1	4
St Mark's	6	5.5	-
St Patrick's	16	4.9	2
St Andrew's	30	4.3	5
St David's	20	5.7	2
Total	96	4.57	15
% of semi-commercial farmers			17

Experience abroad

There is a slight increase in the proportion of semi-commercial farmers over non-commercial farmers who have worked abroad, however, this proportion, 29 per cent, is still below the sample norm, 32 per cent. Most had sought employment in Trinidad as manual labourers, with a few having worked either in North America or the United Kingdom

(Table 8.3). Generally this experience provided them with the means by which they were able to purchase more land than just a subsistence plot upon their return to Grenada.

TABLE 8.3 SEMI-COMMERCIAL FARMERS: PLACE OF WORK ABROAD

Parish	Number of farmers	Place of work abroad: United Kingdom	North America	Aruba, Bonaire, Curacao	Trinidad	Latin America	Other West Indian islands	Total who worked abroad
St George's	17	-	-	1	4	-	1	5
St John's	7	-	-	-	2	1	1	3
St Mark's	6	1	-	1	-	1	-	3
St Patrick's	16	-	1	-	3	-	-	4
St Andrew's	30	2	-	-	5	-	1	7
St David's	20	-	1	1	3	1	1	5
Total	96	3	2	3	17	3	4	27
% of semi-commercial farmers	100	3	2	3	18	3	4	29

Religion

As the proportion of Roman Catholics, 56 per cent, is lower and that of Anglicans, 18 per cent, higher than that of non-commercial farmers, semi-commercial farmers are considered to possess a higher level of economic motivation. Other religious denominations represented are the Seventh Day Adventists, Pentecostals and Methodists (Table 8.4). Again there is a tendency for those with positions of greater social-economic status to be Anglicans or Methodists, and for estate workers and unskilled labourers to be Roman Catholics and

Seventh Day Adventists. However, this concept of work and religion has its exceptions, as is shown by St David's parish where 16 out of 20 farmers in this class are Roman Catholics and only 6 estate workers and unskilled labourers.

TABLE 8.4 SEMI-COMMERCIAL FARMERS: CLASSIFICATION BY RELIGIOUS DENOMINATION

		Religious denomination						
Parish	Number of farmers	Roman Catholic	Anglican	Methodist	Presbyterian	Pentecostal	Seventh Day Adventist	Others
St George's	17	6	4	3	-	1	2	1
St John's	7	5	1	-	-	1	-	-
St Mark's	6	2	1	-	-	-	2	1
St Patrick's	16	10	1	-	-	1	2	2
St Andrew's	30	15	8	1	1	3	-	2
St David's	20	16	3	1	-	-	-	-
Total	96	54	18	5	1	6	6	6
% of semi-commercial farmers	100	56	19	5	1	6	6	6

Race

Although distribution of the farmers by racial groups resembles the sample norm, there are subtle differences in that the proportion of negroes, 56 per cent, is below and that of coloureds, 30 per cent, above their respective norms (Table 5.17 and Table 8.5). Thus, this representation of racial groups reflects the tendency noted amongst religious groups of semi-commercial farmers being more economically motivated than non-commercial farmers. Estate workers and unskilled

TABLE 8.5 SEMI-COMMERCIAL FARMERS: CLASSIFICATION BY RACIAL GROUP

Parish	Number of farmers	Number in racial groups			
		Negro	Coloured	East Indian	White
St George's	17	8	6	-	3
St John's	7	3	3	-	1
St Mark's	6	4	1	1	-
St Patrick's	16	6	9	1	-
St Andrew's	30	19	4	7	-
St David's	20	14	6	-	-
Total	96	54	29	9	4
% of commercial farmers		56	30	10	4

labourers are predominantly negro, although where these positions involve responsibility and authority then they are invariably held by coloureds. Most of the coloureds are, however, employed as skilled labourers or in non-manual work. East Indians are mainly confined to St Andrew's parish and appear in this category as shopkeepers, estate workers, a tailor, a carpenter and a taxi driver. The four whites hold a variety of positions ranging from an unskilled worker to a store manager.

Household structure and character

Households of semi-commercial farmers exhibit far greater stability than those of non-commercial farmers as the majority of heads

TABLE 8.6 SEMI-COMMERCIAL FARMERS: AGE, SEX, and MARITAL STATUS

Parish	Number of farmers	Age in years	Sex		Marital status			
			Male	Female	Single	Married	Widowed	Separated
St George's	17	54.6	13	4	4	10	1	2
St John's	7	56.3	4	3	1	5	1	-
St Mark's	6	53.5	5	1	-	5	1	-
St Patrick's	16	52.3	13	3	2	13	1	-
St Andrew's	30	45.2	26	4	2	26	1	1
St David's	20	51.9	17	3	3	16	1	-
Total	96	50.3	82	14	12	75	6	3
% of semi-commercial farmers			85	15	13	78	6	3

of households are married, 78 per cent, and a larger proportion are male, 85 per cent (Table 8.6). The proportion of married farmers is a reflection of their higher social and economic status as 'marriage has class association and is not only the respectable form of union but one of the indices of upward movement in the social scale'.[1] In many households a wife makes an essential contribution to a semi-commercial farm as she is responsible for the sale of vegetables and fruit in the market and for the management of financial matters.[2] Those farmers less likely to be married are the poorer and younger estate workers and unskilled labourers.

These farmers have an average age of 50.3 years and are therefore

1. Clark, op. cit., p.31.

2. Smith and Kruijer, op. cit., p.82.

only slightly older than non-commercial farmers. Their age structure does reveal more distinct differences as the majority, 58 per cent, of semi-commercial farmers are between 45 and 64 years, with 27 per cent below 45, and 15 per cent over 64. Thus, it is not until an individual is in his fifties that he has sufficient capital and security to become a semi-commercial farmer. Variation in the mean age of farmers ranges between the parishes from 45.2 years in St Andrew's to 56.3 years in St John's (Table 8.6). This variation suggests that land in St Andrew's has been more readily obtained at lower prices than in other parishes, and that in St John's either land is difficult to acquire or there are only limited opportunities for employment which allows part-time farming (this would account for the low proportion of semi-commercial farmers in this parish, Table 7.1).

Levels of living

As farmers of generally higher status than non-commercial smallholders, semi-commercial farmers have a correspondingly higher index of occurrence for selected items, .33 as compared to .28. All items except electricity are more frequently found in households of semi-commercial than non-commercial farmers (compare Table 7.8 with Table 8.7). There is also less variation between parochial indices, as these range from .20 in St John's, to .47 in St George's and St David's. The high value for St George's is revealing, since both educational attainment and social-economic status of its farmers are not outstanding in comparison to the other parishes. This high index therefore illustrates how a developed environment, or social-economic landscape,

influences inhabitants in it to achieve higher goals than they might otherwise have been expected to attain. St John's parish, on the other hand, is hampered by the low level of education of its farmers and the fact that women head 3 households out of 7.

TABLE 8.7 SEMI-COMMERCIAL FARMERS: LEVELS OF LIVING AS INDICATED BY POSSESSION OF CONVENIENCES AND GOODS

Parish	Number of farms	Conveniences and goods: Electricity	Sewerage	Plumbing	Gas stove	Refrigerator	Radio	Telephone	Motor vehicle	Index of occurrence
St George's	17	6	6	8	12	6	15	4	4	.47
St John's	7	1	1	2	1	1	5	-	-	.20
St Mark's	6	2	2	6	4	2	4	-	1	.44
St Patrick's	16	1	1	7	8	2	13	1	1	.28
St Andrew's	30	3	4	12	15	6	26	1	3	.29
St David's	20	7	4	10	17	5	17	-	6	.47
Total	96	20	18	45	57	22	70	6	15	.33
% of semi-commercial farmers	100	21	19	46	59	23	72	6	15	

Summary

Semi-commercial farmers, while a diverse group in their social and economic achievements, do not represent the same extremes as those noted for non-commercial farmers as they bear a closer resemblance to the sample norm. Although the typical farmer is still negro, Roman Catholic and works on an estate, he has a more stable marital status, is slightly older (probably about 50 years) and has a higher level of living than his non-commercial counterpart. The probability

of his conforming to this stereotype has lessened as a greater proportion are skilled and non-manual workers, Protestant and coloured. As a result of the increased proportion of Protestant and coloureds these farmers are considered to have greater motivation for material gain than non-commercial farmers. It is these differences which influence the nature and distinguish the semi-commercial aspect in the structure of small farming.

The agricultural unit

In a discussion of the agricultural system of semi-commercial farmers, it is necessary to modify the terms 'traditional' and 'progressive' as they apply to this and all succeeding categories of farmers. Previously these terms were applied to non-commercial farmers to establish a dichotomy between types of farmers with differing attitudes and practices in the cultivation of food crops (supra, p.146). These terms have now to be considered to include cash crop production, principally export crops.

The farmer with a traditional approach to agriculture is one with a closed mental outlook which stems from his limited education and lack of personal enterprise. Consequently he has little regard for the quality of his produce and once his land is established in tree crops he regards his output as the result of a minimum of input. His trees are of dubious quality and may have no systematic arrangement or spacing in their planting. Insufficient attention is paid to pruning, removal of diseased cocoa and dying branches, weeding or soil conservation. While lack of knowledge and capital may restrict performance

of these practices, he is also hindered by his scepticism of progress and his wariness of changing those practices to which he is accustomed. As noted in Chapter 5, traditional methods are revered, which is not surprising in view of the fact that belief in obeah (black magic) and spiritualism are still part of the folklore in rural communities. Thus, it is difficult to persuade the less-educated elements of these rural people that to disregard or deviate from the practices of their forefathers is not a sin. Among semi-commercial and the two subsequent types of farmers, those with strong traditional values usually have less than fifth standard education and/or no experience abroad. Such farmers are mainly estate workers and unskilled labourers.

The progressive farmer is concerned not only with the quantity but also with the quality of his production and to these ends uses a scientific and analytical approach to his farming. He is selective in his choice of trees and plants new and improved strains suited to the environment in which he farms, such as the recently developed short-stemmed Robusta banana which is more resistant to wind than previous varieties, or the clonal variety of cocoa recommended to him by the extension service. To ensure maximum production and quality he spaces his trees in accordance with the dimensions suggested by agricultural officials, sprays against disease, prunes his trees for optimum growth, takes the requisite steps to ensure fertility by using appropriate chemical fertilizers and limits erosion by having an adequate network of contour drains, down drains and grass barriers. Such practices are followed because their worth is appreciated. An important aspect of his character is the ability to accept and assimilate

new ideas when and where they might profit his production. Such farmers can be associated with all occupational groups but in particular with those whose educational level is of the fifth standard and higher, or whose occupational experience has included several years of employment overseas.

On applying these criteria to semi-commercial farmers, 42 per cent are considered as being progressive in attitude. This proportion is higher than in non-commercial farmers, a difference that is reflected in their improved agricultural practices.

Size, fragmentation and tenure of holdings

With respect to farm size, degree of fragmentation and pattern of tenure, semi-commercial farms differ from non-commercial holdings. Their mean size is more than twice as large at 2.67 acres with relatively little variation in size existing between the parishes (Table 8.8). Associated with this increase in size is a rise in the degree of fragmentation to an average of 2.13 fragments per farm, or an increase of 0.5 fragments over that of non-commercial holdings. Of these farms 21, or 22 per cent, consist of a single fragment, 44, or 46 per cent, have two fragments, 28, or 29 per cent, have three, and only 3 have four pieces of land. The larger the farm, the more likely it is to be composed of several fragments. Thus, growth of a farm is usually piecemeal, as large fragments are scarce in a patchwork of small holdings, and to have saved the capital necessary for such a purchase requires more time and patience than it is reasonable to assume or expect the farmer to have. The exception to this pattern of growth is where a farmer

had worked abroad for many years and could afford to purchase a large parcel of land on his return. Growth of the farm is usually achieved by the freehold purchase of an additional fragment, rather than through any form of leasing. Consequently the proportion of fragments which are owned increases to 71 per cent, with the remainder either being rented, held in trusteeship, or share-cropped (Table 7.10). Land which is not owned is commonly occupied by the poorer estate workers and unskilled labourers who cannot afford to purchase it. All share-cropped land belongs to sugar-cane estates, mainly in the southern part of St George's parish.

The greater investment that semi-commercial farmers have in land results in more interest being taken in working the soil, so that 79 per cent of the total holding is cultivated. There is considerable variation

TABLE 8.8 SEMI-COMMERCIAL FARMS: CHARACTERISTICS OF THE FARMS

	Characteristics				
Parish	Number of farms	Mean number of fragments	Mean size of farm (acres)	Mean size of cultivated land (acres)	% cultivated land of total land
St George's	17	1.94	2.74	2.21	81
St John's	7	2.15	2.98	2.28	76
St Mark's	6	2.16	2.58	2.50	97
St Patrick's	16	2.12	2.26	1.82	81
St Andrew's	30	2.20	2.56	2.09	81
St David's	20	2.20	2.97	2.12	71
Total	96	2.13	2.67	2.12	79

in this amount, with 71 per cent in St David's parish and 97 per cent in St Mark's (Table 8.8). The lower figure in St David's is attributed to some non-manual workers having land but not necessarily working it to maximum advantage, as some of their land was bought for speculation rather than cultivation.

General description of regions and methods of cultivation

Kitchen gardens and provision grounds are both present on these farms, although they are not the dominating features, as orchards of cocoa, nutmegs and bananas prevail. This arboriculture is practised principally on fragments other than F1, where the kitchen garden remains the important feature. The particular land use on a given fragment varies with respect to its location and altitude on the island. At elevations below 800 feet and where annual rainfall is greater than 65 inches, bananas and cocoa are the dominant export crops. Methods of cultivation differ, since these crops may be cultivated in pure stands, interplanted with each other, or interspersed with food trees. A popular practice when establishing land in cocoa (as was the case following the destruction caused by Hurricane Janet) is to use bananas as a temporary shade crop for cocoa during the first 5 or 6 years of its growth, for bananas supply an income while the cocoa tree is unproductive. Bananas are, however, phased out as cocoa trees begin to 'declare' their pods. Other suitable temporary shade crops for cocoa are bushes of pigeon peas and castor oil plants, although these are uncommon. In addition cocoa requires permanent shade trees and although the most

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Kitchen gardens and provision grounds are both present on these farms, although they are not the dominating features, as orchards of cocoa, nutmegs and bananas prevail. This arboriculture is practised principally on fragments other than F1, where the kitchen garden remains the important feature. The particular land use on a given fragment varies with respect to its location and altitude on the island. At elevations below 800 feet and where annual rainfall is greater than 65 inches, bananas and cocoa are the dominant export crops. Methods of cultivation differ, since these crops may be cultivated in pure stands, interplanted with each other, or interspersed with food trees. A popular practice when establishing land in cocoa (as was the case following the destruction caused by Hurricane Janet) is to use bananas as a temporary shade crop for cocoa during the first 5 or 6 years of its growth, for bananas supply an income while the cocoa tree is unproductive. Bananas are, however, phased out as cocoa trees begin to 'declare' their pods. Other suitable temporary shade crops for cocoa are bushes of pigeon peas and castor oil plants, although these are uncommon. In addition cocoa requires permanent shade trees and although the most

suitable types are tamarind and silk cotton which do not yield saleable crops, many small farmers accept a lower return on their cocoa by planting more useful trees, such as coconut, breadfruit and mango, which provide too dense a shade over a restricted area to be ideal. Once established, cocoa forms relatively pure stands, however, dasheen and tannias may be cultivated underneath the cocoa since they increase the humidity around the cocoa, a desirable practice in some of the drier parts of the island. Generally soil is not a critical factor in the cultivation of cocoa, provided it is about two feet deep and not heavy clay. Thus, on most of the island where slopes are less than 10^{o} cocoa can be cultivated. Those bananas which do not provide temporary shade for cocoa are grown as a separate crop, preferably in locations protected from the high winds. Between banana plants, a cover of water grass, cow peas or tannias is often grown. On farms noted as being progressive, bananas are weeded about the base of their stems, chemically fertilized and mulched. Bananas grow in a variety of soil types including the principal soils of the island, the Woburn, Capitol and Belmont clay loams (Fig. 7). Where land is being prepared for planting bananas or cocoa, the soil is broken-in with vegetable crops, often a leguminous crop, such as pigeon or cow peas, and a ground provision, usually tannias. Such crops often serve as cover crops when bananas are planted or, in the case of pigeon peas, as a temporary shade crop for cocoa. Above 1000 feet the humidity becomes too high for the successful cultivation of cocoa, since production is affected by Black Pod disease. Here, nutmegs thrive and together with bananas become the principal tree crops. These crops may be interplanted, but

are usually cultivated in pure stands, as nutmeg trees can be either male or female in type and require the presence of both sexes to enable cross-pollination to occur. The area beneath nutmeg trees is often cleared of growth once the trees are established, a practice that facilitates the collection of nutmegs and mace from the ground.

Throughout the island the choice of food crops is largely determined by the climate. In the drier coastal margins the most common crops are pigeon peas, corn, cassava and sweet potatoes, while in areas with an annual rainfall of 60 inches and at an elevation below 800 feet most vegetables can be cultivated. Above this height, conditions tend to favour temperate root and leaf crops, although the topography severely limits such cultivation. Vegetable gardening is thus confined mainly to gently sloping land (A to C slope category) and to areas where the soils are easily worked and free from stones, such as fertile Woburn clay loam (supra, p.25). Greater consideration is given to soil type when planting vegetables than export crops. Farmers specializing in vegetable crops use both traditional and progressive methods of cultivation, though occasionally both methods are present on the same holdings. Major producers of food crops, however, use progressive methods and have carefully manured beds of single crops, stakes for their tomato plants and sweet potato vines, seed boxes and a system of crop rotation. Such farmers grow a variety of crops and have staggered the time of their planting, so that they are assured of sending a continuous supply of produce to market, and not just an intermittent stream of goods when a surplus arises.

Land use

Vegetables

As most semi-commercial farms have developed from non-commercial holdings, certain features remain the same, most notably the kitchen garden which is a principal characteristic of F1. A comparison of kitchen gardens on these two types of farms reveals the extent of their similarity (Tables 7.11 and 8.9). Both have comparable indices of vegetable crop occurrence, and essentially the same distribution of crops with pigeon peas, yams, tannias, dasheen, corn and tomatoes being the most common. At the parish level semi-commercial farmers in St Mark's, despite their vastly improved educational attainments over their non-commercial counterparts, have limited development of kitchen gardens as the presence of only 10 types of vegetables indicates, owing to the absence of any established food crop production and the lack of suitable slopes and soils (supra, p.33). St George's parish remains outstanding for its kitchen gardens, as they have the highest index of occurrence of vegetable crops, .31, and the greatest variety of crops, 24. Differences do exist, however, between these two types of farms, as in both St Patrick's and St Andrew's parishes the indices of occurrence are higher for F1 on semi-commercial farms than on non-commercial holdings, the result of more active and knowledgeable farmers cultivating a wider range of crops (Table 8.9).

Vegetable crops have decreasing indices of occurrence on provision grounds, fragments F2 to F4 (Table 8.9). This overall trend is not evident in all parishes, particularly in St George's and St David's,

TABLE 8.9 SEMI-COMMERCIAL FARMS: VEGETABLE CROP OCCURRENCE

Parish	Fragment number	Number of fragments	Tropical roots & tubers							Temperate roots				Green leaf		
					Ground provisions											
			Arrowroot	Cassava	Dasheen	Eddoes	Sweet potatoes	Tannias	Yams	Beetroot	Carrots	Onions	Radishes	Cabbages	Celery	Lettuce
St George's	1	17	-	6	6	5	4	3	10	1	1	-	1	4	1	7
	2	12	-	5	1	3	8	5	10	1	4	-	2	3	-	5
	3	4	-	2	2	1	2	2	2	-	-	-	-	1	-	1
St John's	1	7	-	1	4	-	1	5	4	-	-	-	-	1	-	1
	2	6	-	-	1	-	1	1	2	-	-	-	-	1	-	-
	3	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
	4	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-
St Mark's	1	6	-	1	1	-	-	4	4	-	-	-	-	-	-	-
	2	5	-	2	-	-	-	4	3	-	-	-	-	-	-	-
	3	2	-	-	-	-	-	1	1	-	-	-	-	-	-	-
St Patrick's	1	16	-	6	6	-	8	12	9	4	2	1	2	4	1	6
	2	13	-	3	-	2	5	4	6	-	-	-	1	1	-	1
	3	4	-	-	-	-	-	-	1	-	-	-	-	-	-	-
	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St Andrew's	1	30	-	9	12	-	5	15	22	2	-	-	-	6	-	8
	2	24	-	2	9	1	3	12	11	-	-	-	-	1	-	2
	3	11	-	3	3	-	9	4	3	-	-	-	-	1	-	2
	4	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-
St David's	1	20	-	7	9	1	5	8	14	1	1	-	-	5	-	5
	2	15	-	7	4	1	8	6	7	2	1	-	1	3	-	2
	3	9	-	5	4	-	6	4	6	1	1	-	-	2	-	1
Total	1	96	-	30	38	8	23	52	63	8	4	1	3	20	2	27
	2	75	-	19	15	7	25	32	39	3	5	-	4	9	-	10
	3	31	-	10	9	1	10	12	13	1	1	-	-	4	-	4
	4	3	-	-	2	-	-	2	-	-	1	-	-	1	-	1

TABLE 8.9

Parish	Fruit and pod											Others		Index of occurrence	Number of different crops
	Corn	Cow peas	Cucumbers	French beans	Groundnuts	Melogene	Okra	Peppers	Pigeon peas	Pumpkins, melons	Tomatoes	Seasoning	Sugar cane		
St George's	8	4	5	2	4	4	9	7	12	-	9	3	6	.31	24
	7	3	5	4	1	3	5	3	10	-	3	2	6	.31	23
	1	1	1	-	2	1	-	1	2	-	1	1	-	.29	17
St John's	1	1	2	2	1	-	2	3	6	-	1	-	3	.21	17
	-	-	-	1	-	-	1	-	1	-	1	1	-	.07	10
	-	-	-	-	-	-	-	-	-	-	-	-	-	.04	1
	1	-	1	-	-	-	-	-	1	-	-	-	-	.27	7
St Mark's	2	-	1	-	-	-	1	1	5	-	1	1	-	.14	10
	3	-	1	-	-	-	-	-	5	-	-	-	-	.13	6
	1	-	-	-	-	-	-	-	-	-	-	-	-	.04	3
St Patrick's	8	2	7	7	-	4	6	8	13	-	5	2	3	.27	24
	5	-	1	2	2	-	4	1	4	-	2	-	1	.13	17
	1	-	-	-	-	-	-	-	1	-	2	-	-	.04	4
	-	-	-	-	-	-	-	-	-	-	-	-	-	.00	-
St Andrew's	12	5	9	8	3	4	12	8	17	2	15	2	1	.21	21
	2	4	5	5	-	2	3	3	9	-	4	-	1	.13	19
	-	-	1	1	-	-	-	-	5	-	2	-	-	.11	12
	-	-	-	-	-	-	-	-	1	-	-	-	-	.15	4
St David's	2	1	5	5	-	2	9	7	15	-	-	4	4	.23	21
	1	-	4	5	-	1	3	2	8	2	6	2	4	.22	23
	1	1	4	2	-	1	3	2	5	2	5	1	-	.25	21
Total	14	13	29	24	8	14	36	34	68	2	38	12	23	.24	26
	6	8	16	17	3	6	16	9	37	3	16	5	15	.17	24
	2	2	6	2	2	2	3	3	13	2	9	9	-	.15	21
	-	-	1	-	-	-	-	-	1	-	-	-	-	.11	8

where provision grounds show little difference in either the occurrence or the frequency of their vegetables. The explanation for this small difference between kitchen gardens and provision grounds is that yams, tannias, sweet potatoes, cow peas and cassava are frequently interplanted with cane setts, particularly on land which is share-cropped since it permits the share-cropper to maximize his return from this land (supra, p.113). In the case of St George's parish some farmers also specialize in food crop production, so that much of F2, F3 and F4 is devoted to vegetables. By contrast, provision grounds in other parishes are minor features where little more than pigeon peas, corn and some ground provisions are grown.

Tree crops

Indices of occurrence of tree crops decline with increase in fragment number, from .55 on F1 to .00 on F4 (Table 8.10). Tree crops are an integral part of the kitchen garden and can provide an additional source of food. Thus trees most commonly found on F1 are those whose crops can be eaten. They include, in order of frequency, coconuts, bananas, breadfruit, mangoes, and cocoa (the beans of which are cooked as a vegetable). Part of F1 is sometimes devoted to export crops, so that bananas, cocoa and nutmegs are produced as cash crops. This dual purpose of F1 subsequently accounts for its higher index for tree crops, .55, than that on F2, .36. Of the parishes, St Mark's, .66, and St John's, .63, have the highest indices and since both had low indices for vegetables, tree crops appear to compensate for this lack of vegetables.

TABLE 8.10 SEMI-COMMERCIAL FARMS: TREE CROP OCCURRENCE

Parish	Fragment no.	No. of fragments	Avocado pear	Bananas	Breadfruit	Cocoa	Coconut	Lime	Other citrus	Mango	Nutmegs	Sapodilla	Other fruits	Index of occurrence
St George's	1	17	6	13	11	7	17	6	10	15	2	2	6	.51
	2	12	3	5	3	3	6	-	2	8	1	-	3	.34
	3	3	1	1	-	-	-	1	-	-	-	-	-	.27
St John's	1	7	4	6	2	5	7	4	6	5	5	1	3	.63
	2	6	1	5	4	4	3	2	2	4	5	-	1	.47
	3	1	1	1	1	1	-	-	1	-	1	-	-	.54
	4	1	-	-	-	-	-	-	-	-	-	-	-	.00
St Mark's	1	6	3	5	6	5	6	5	4	4	4	1	1	.16
	2	5	3	4	3	5	3	1	3	2	4	-	-	.51
	3	2	1	-	1	1	1	-	-	1	1	-	-	.27
St Patrick's	1	16	9	15	11	7	12	7	8	11	7	3	6	.54
	2	13	4	8	5	7	6	1	1	5	6	1	2	.32
	3	4	-	-	-	1	-	-	-	-	1	-	-	.04
	4	1	-	-	-	-	-	-	-	-	-	-	-	.00
St Andrew's	1	30	10	22	21	18	24	8	15	13	14	6	6	.53
	2	24	7	16	13	13	13	2	7	9	14	2	2	.37
	3	11	1	5	5	4	5	-	1	3	5	-	3	.26
St David's	1	20	5	18	16	14	15	4	10	18	10	4	8	.53
	2	15	4	6	5	4	7	1	1	7	5	1	5	.28
	3	9	3	6	6	3	2	2	-	3	4	-	2	.31
Total	1	96	37	79	67	57	81	34	53	66	42	17	30	.55
	2	75	22	44	33	36	38	7	16	35	35	4	13	.36
	3	31	7	13	13	10	8	3	2	7	12	-	5	.21
	4	3	-	-	-	-	-	-	-	-	-	-	-	.00

Cash crops

The foregoing descriptions gave no indication of the relative commercial importance of the crops found in these fragments, but this can be obtained by considering the crops ranked by semi-commercial farmers as their major sources of agricultural income. This income, however, does not represent the net profit of a particular crop as no records of input in terms of labour or capital are taken into consideration. Cash crops include export crops, which are sold mainly to specific co-operatives, food crops including both fruits and vegetables, which are sold in the local market place or to a huckster, and sugar cane, which is sold to the Woodland's sugar mill in St George's parish.

While all semi-commercial farmers sell at least one crop, 84 per cent sell two and 54 per cent three or more. The principal sale is of export crops and indicates that it is these which are the distinctive feature of this farming system, in contrast to food crops which characterise non-commercial holdings.

The three export crops account for 71 per cent of the principal cash crops. Cocoa, the most important crop on 33 per cent of these holdings, is the principal source of agricultural income, and in all parishes except St George's and St Andrew's is the main crop. Bananas, the major crop on 21 per cent of these farms, are the second most important cash crop and predominant in St Andrew's parish. Nutmegs complete the triumvirate and are the major crop on 17 per cent of these farms. St George's parish is an exception in that its principal commercial crop is sugar cane. It also has the largest proportion of food crop producers (Table 8.11).

TABLE 8.11 SEMI-COMMERCIAL FARMS: PRINCIPAL CASH CROPS

Parish	Export crops: Bananas	Export crops: Cocoa	Export crops: Nutmegs	Limes	Coconut	Cane	Ground provisions	Beans, corn, peas	Leaf and salad veg.	Temperate root crops	Other cruits	None
Principal cash crop												
St George's	-	4	1	-	1	6	3	-	1	1	-	-
St John's	2	3	-	-	-	-	1	-	1	-	-	-
St Mark's	1	4	-	-	-	-	-	-	-	-	1	-
St Patrick's	4	6	3	-	-	-	-	3	-	-	-	-
St Andrew's	11	8	7	-	1	-	-	2	1	-	-	-
St David's	2	7	5	1	-	2	1	-	2	-	-	-
Total	20	32	16	1	2	8	5	5	5	1	1	-
% of total	21	33	17	1	2	9	5	5	5	1	1	-
Second cash crop												
St George's	2	2	1	-	1	1	-	3	2	-	1	4
St John's	2	-	3	-	-	-	-	-	-	-	1	1
St Mark's	1	-	2	-	-	-	-	-	-	-	-	3
St Patrick's	3	3	2	-	-	-	4	-	-	-	1	2
St Andrew's	3	7	13	-	2	-	2	-	1	-	-	2
St David's	-	3	5	-	1	1	3	3	1	-	1	3
Total	11	15	26	-	4	2	9	6	4	-	4	15
% of total	12	16	27	-	4	2	9	6	4	-	4	16
Third cash crop												
St George's	1	-	-	-	-	-	3	-	1	-	2	10
St John's	1	-	1	-	-	1	1	-	1	-	-	2
St Mark's	1	-	2	-	-	-	-	-	-	-	-	3
St Patrick's	3	-	1	-	-	-	-	1	1	-	1	9
St Andrew's	5	6	4	-	-	-	-	2	-	-	1	12
St David's	3	3	2	-	-	-	2	2	-	-	-	8
Total	14	9	10	-	-	1	6	5	3	-	4	44
% of total	15	9	10	-	-	1	6	5	-	-	4	46

There is a similar emphasis on these crops for the second most important crop, of which export crops again account for 72 per cent. Nutmeg is most frequently named, and is followed by cocoa and bananas (Table 8.11). Of farmers who sell cocoa as their first crop, over half have nutmegs as their second; similarly for those growing bananas, more than half named cocoa as their second. There are more farmers with food crops as a second crop than there are for their principal cash crop. Such food crops are mainly ground provisions, beans, corn and peas. Cane farmers rarely have a second cash crop, but if they do it is usually vegetables. Of the 52 farmers who have a third cash crop, 34, 65 per cent, named an export crop, mainly bananas (Table 8.11). Apart from 2 farmers who sold sugar cane, the remainder sold food crops as their third crop, indicating that there is a propensity for fruits and vegetables to be regarded as a secondary source of income. Food crop production is largely restricted to St George's and St David's parishes where soils and slopes are favourable to vegetable gardening. Food crop cultivation is further encouraged by the presence of the island's foremost market place in St George's Town.

Social aspects of crop specialisation

Crop specialisation reflects certain aspects of the social-economic background of the farmer. Thus, two-thirds of the estate workers and unskilled labourers cultivate either bananas or cocoa as their principal cash crop, and only estate workers sell ground provisions as their main crop. Farmers with non-manual occupations are likely to cultivate cocoa and nutmegs, since these crops can be

conveniently attended at weekends, unlike vegetables which require close vigilance at certain stages of growth or bananas which require cutting on Mondays for the weekly shipment on Tuesdays. Thus, it is mainly estate workers on task work and those no longer employed or employable who grow vegetables, since they have the time to give daily attention to their kitchen gardens and provision grounds.

Racial preferences for the cultivation of certain crops are also apparent: no East Indians sold vegetables, and negroes, with only one exception, are the only producers of sugar cane and those more likely to cultivate food crops. The reasons for this association between race and crop production are historical and a further reminder of the vestiges of slavery. Levels of education do not appear to influence crop specialisation, although they do affect the efficiency of production.

Livestock

Livestock are more important on this type of farm than on non-commercial holdings, as can be seen from the increased ratios of animals to households (compare Table 7.13 with Table 8.12). This increase is due to greater wealth, an educational level which has led to an appreciation of the nutritional value of meat and milk, and a farm-size which permits a greater number of animals to be maintained. Where land is either scarce or costly, as along the south coast, livestock are regarded as an intermediate form of investment to the purchase of land.

Fowls remain the most popular type of livestock and are present on 73 per cent of these farms. Although this occurrence is higher than

TABLE 8.12 SEMI-COMMERCIAL FARMS: NUMBER AND DISTRIBUTION OF LIVESTOCK

Parish	No. of farms	Fowls/household	Dairy cattle	Beef cattle	Milch goats	Meat goats	Pigs	Sheep	Draught donkeys	Manure donkeys
			Number of livestock							
St George's	17	11.8*	12	9	1	10	14	12	1	2
St John's	7	8.1	-	-	1	2	4	7	3	-
St Mark's	6	9.7	4	1	1	-	3	6	1	1
St Patrick's	16	9.6	6	2	3	3	13	11	3	3
St Andrew's	30	6.3	4	6	6	9	22	11	-	3
St David's	20	12.3	8	10	4	7	13	12	3	3
Total	96	9.2	34	28	16	31	69	59	11	12
Ratio/household			.35	.29	.18	.32	.72	.62	.11	.12
			Number of farms with livestock							
St George's			10	6	7	1	4	8	6	1	2
St John's			4	6	7	1	4	8	6	1	2
St Mark's			3	3	1	1	-	2	3	1	1
St Patrick's			11	5	2	2	2	10	5	3	3
St Andrew's			25	4	6	6	8	12	2	9	3
St David's			18	8	7	2	4	9	2	3	3
Total			70	26	23	13	21	43	22	20	12
Percentage of semi-commercial farms			73	27	24	14	22	45	23	21	13

* Ratio on basis for 16 farms, excludes farm with 250 birds

that on non-commercial holdings there is no difference in either their quality or the number of birds per household (one farmer in St George's parish had 250 Leghorns which he was raising as broilers, but as this was a new venture which had made no sale at the time of interview, and an isolated example, it was not included in determining the ratio of fowls per household in St George's parish). Pigs remain the most ubiquitous of other animals. However, the main difference between these two categories of farm is the higher ratio of dairy and beef cattle on semi-commercial farms (Table 8.12). There is, nevertheless, no appreciable difference in quality or management of these animals, which are both still low. It is in the parishes of St George's and St David's that livestock are most significant. They are particularly concentrated along the southern coast in the sugar cane belt where bagasse is an important feed during the dry season. It is an area where share-cropping of fragments exists, a practice which is transferred to livestock, whereby the owner of a cow, sheep or goat gives custody of the animal to a friend or neighbour. In return for looking after the animal, the farmer takes an agreed portion of the animal, either of its selling price or its meat; where offspring are born the custodian keeps a calf, kid or lamb. Few livestock are kept in St John's, a further indication of the poverty and low level of farming practised in this parish.

Other farm characteristics

In analysing the components of the semi-commercial farm, it has continually been noted that their stage of development is more advanced than that of non-commercial holdings. This becomes more evident when

examination is made of the farmer's source of agricultural knowledge, his tools and his farming practices.

Sources of farming knowledge

The most frequently identified source of farming knowledge is that of parents and guardians, 79 per cent. Those who did not acknowledge this source are better educated people who have a progressive outlook towards agriculture. One-third of these farmers have learnt something about farming from their friends and neighbours, denoting a more receptive and co-operative attitude to agriculture than is associated with non-commercial holders who did not admit to benefiting in this way. A smaller proportion, 25 per cent, have learnt from their estate experiences, an indication of the differences in social background between these two groups. MacDonald's Almanac remains a popular guide for farming practices, with 70 per cent adhering to it. Those who are not influenced by the phases of the moon include some estate workers who are ignorant of the supposed lunar influence, workers who had several years of experience in the Dutch Islands, the United Kingdom or North America, and civil servants. Over half, 54 per cent, of these farmers are acquainted with their local extension instructor, an increase in contact which is attributable to the commercial aspect of these farms, whereby both the farmer and the instructor are concerned with improving production. Farmers unlikely to have this contact are either the poorer manual workers who have less than two acres of land or some of those who have worked abroad and consider themselves to be more knowledgeable of farming than the instructors. The advice most frequently given

by the instructor concerns the type and application of fertilizers, the lining of drainage ditches, the planting of windbreaks and the supply of quality seeds and seedlings. Such contact enables these farmers to obtain farm subsidies either for crops and fertilizer, or for authorized farm improvements such as drainage ditches and windbreaks. The progressive farmers generally take advantage of this service, while the traditional farmer is less likely to realize that he can benefit from such schemes and hence does not seek out his extension instructor.

Farming practices

An indication of the vastly improved level of farming practice is evident in the fact that 93 per cent of semi-commercial farmers fertilize their crops as compared to only 48 per cent of non-commercial farmers. The 7 per cent who do not use fertilizer of any kind are those who cannot be bothered or cannot afford it. A majority, 56 per cent, use both manure and chemical fertilizer, while 21 per cent use only manure and 17 per cent only chemical (Table 8.13). To facilitate the collection of manure, livestock on these farms are commonly penned or tethered. Donkeys are frequently kept as peripatetic manure suppliers and are penned on various fragments, or even on different parts of the same fragment, where manure is required (a practice sometimes called 'fly-penning'). Cattle are sometimes penned in a similar way, although some farmers complain that cattle manure is stronger than donkey manure and has to be applied more carefully so as not to burn the soil. When available, manure is used mainly on beds of vegetable crops and sometimes on land being established in export crops.

TABLE 8.13 SEMI-COMMERCIAL FARMS: USE OF FERTILIZER AND PRACTICE OF MULCHING

Parish	Number of farms	Type of fertilizer: Manure only	Chemical only	Chemical and manure	Total using fertilizer	Total using mulch
St George's	17	1	4	11	16	17
St John's	7	2	2	1	15	4
St Mark's	6	2	-	3	5	5
St Patrick's	16	3	3	8	14	11
St Andrew's	30	9	3	18	30	23
St David's	20	3	4	13	20	17
Total	96	20	16	54	90	77
% of semi-commercial farms	100	21	17	56	94	80

These farmers are more discriminating in their use of chemical fertilizer than are non-commercial farmers, as besides 12-8-24 which is used mainly in nutmeg and cocoa areas, they use 11-11-33 on their banana crops. Ammonium sulphate is more widely used on vegetables. This improved use of chemical fertilizers largely reflects the increased contact with extension instructors.

Similarly, mulching is more widely practised than on non-commercial holdings, and 80 per cent of semi-commercial farmers employ this method of soil and moisture conservation (Table 8.13). Thus, with greater investment in the land, farmers are prepared to make greater inputs.

Tools

Semi-commercial farmers are better equipped than their non-commercial counterparts; their index of occurrence is .74, as compared to .61. All types of tools have a greater representation although none more striking than the fork and cocoa knife (compare Table 7.15 with Table 8.14), an indication that these two implements are important in the production of export crops.

Among the parishes, St David's is the best equipped as it has an index of .82 (a position which corresponds to its level of living and education) while the younger farmers of St Andrew's are the least equipped, .67. The remaining parishes have similar indices (Table 8.14). There is some regional variation in the type of hoe which is used. Farmers in St George's and St John's parishes prefer the larger

TABLE 8.14 SEMI-COMMERCIAL FARMS: DISTRIBUTION OF TOOLS AND THEIR INDEX OF OCCURRENCE

Parish	Number of farms	Tools							Index of occurrence
		Dutch hoe	Weeding hoe	Cutlass	Spade	Fork	Sack or basket	Cocoa knife	
St George's	17	13	9	17	10	17	16	5	.73
St John's	7	5	-	7	7	7	7	4	.75
St Mark's	6	3	-	5	6	6	5	5	.71
St Patrick's	16	8	4	16	11	15	15	11	.72
St Andrew's	30	4	12	30	24	29	28	15	.67
St David's	20	11	16	20	17	20	19	12	.82
Total	96	44	41	95	75	94	90	62	.74
% of semi-commercial farms	100	46	43	99	78	98	94	65	

Dutch hoe, a tool uncommon in St Andrew's, while the smaller weeding hoe gains favour in St Andrew's and St David's. No satisfactory explanation can be found, since it would be expected that in the principal parish for vegetable gardening, St George's, the weeding hoe would be a more appropriate tool and that where vegetable gardening is least developed, St Andrew's, this tool would have limited use. The terrain or composition of soils does not indicate the suitability of one hoe over the other. This is another illustration of an idiosyncrasy existing among small farmers.

Among semi-commercial farmers the index of tool occurrence has not served to distinguish meaningful levels of farming between the parishes, but it has highlighted one of the differences between these farmers and non-commercial smallholders.

Labour

These farmers estimate their weekly input of labour to be about 16 hours per week, varying from mere supervision to 40 hours in the case of a pensioned worker. The working habits of these farmers reflect both their interest in the land and their occupation. Estate workers and unskilled labourers often work a couple of hours each day on their land, since many work a six-hour day or do task work which enables them to work even shorter hours. Estate workers traditionally do not work on Friday and so they are free to work their own land on that day. Thus, if they are so inclined, knowledgeable and in possession of suitable land, vegetable gardening, which requires daily attention, is possible. For artisans, who have erratic contracts, and

for those non-manual workers who work a regular eight-hour day for five or five and a half days a week, it is inconvenient, if not impossible, to attend to all their fragments regularly, hence the suitability of tree crops which do not require regular attention.

At planting and harvest times hired labour may be engaged if sufficient assistance is not forthcoming from the household. An alternative system is 'day-for-day' work, whereby a friend or neighbour is called upon to assist with a job, in return for which he may receive a meal or a drink; at a later date this help is reciprocated. In the cane belt a work party, known locally as 'maroon', is sometimes organised to cut and transport the cane to the mill. The organizer invites a number of relatives and friends to help him on a given day. In return for their labour, the host provides a meal and supplies refreshments, the cost of which is often as much as if he paid workers.

Differences between the parishes in the weekly input of labour are slight, however, there is some regional variation in that farmers along the south coast work shorter hours, 2 to 4 hours less, owing to the debilitating heat and to the nature of their crops, such as sugar cane, yams, pigeon peas, cassava and corn, which receive little attention once they are planted.

Farming problems

Semi-commercial farmers regard their agrarian problems in a similar way to non-commercial smallholders, as the most common complaints relate to limitations of production. The increased frequency with which these problems are cited is attributable to the increase in

farm investment and the added interest and ability of the farmer to perceive restrictions to his farming. The most serious handicap is clearly that of pests and disease, about which 85 per cent of these farmers complain. The problem is a real one and during the course of the survey farmers regularly pointed out diseased cocoa and nutmeg trees, as well as cocoa pods, coconuts, corn and sweet potatoes which had been partially eaten by rats. Praedial larceny, a particular complaint in St Andrew's parish, affects almost a third of these farmers, mainly with respect to food crops rather than export crops (Table 8.15). A major difference between semi-commercial and non-commercial farmers is the recognition that the road network is inadequate and so hinders agricultural development. Farmers who mentioned this as a problem usually have at least two fragments, some of which are only accessible by dirt

TABLE 8.15 SEMI-COMMERCIAL FARMS: AGRICULTURAL PROBLEMS AS IDENTIFIED BY THE FARMER

		Types of problems							
Parish	Number of farms	Difficulty in hiring labour	Poor roads	Lack of capital	Erosion	Pests and disease	Inability to acquire land close to home	Praedial larceny	Water supply
St George's	17	5	5	5	2	16	3	3	1
St John's	7	-	1	1	1	3	1	1	-
St Mark's	6	1	1	1	1	5	2	1	-
St Patrick's	16	3	9	5	3	15	1	3	4
St Andrew's	30	3	16	7	9	26	2	15	2
St David's	20	5	8	9	3	18	2	2	1
Total	96	17	40	28	18	82	11	29	8
% of semi-commercial farmers	100	18	42	29	19	85	11	30	8

road or path. Surprisingly this problem is most frequently identified in St Patrick's and St Andrew's parishes, rather than in St Mark's and St John's where the road system is least developed (Table 3.3). More perceptive farmers identify erosion, the inability to acquire land close to their home and the lack of reliable hired labour as other factors handicapping their agriculture. That poor market facilities and prices do not receive greater mention reveals a lack of identification of external forces which influence production. Thus, their problems are primarily associated with the internal management of their land as they affect the quantity of production rather than the quality and marketability of their crops.

Levels of farming

As a whole semi-commercial farmers have been noted as consistently representing a higher level of agriculture than that of non-commercial farmers, but differences in parochial levels of farming have been masked by inconsistencies in the analysis. In order to obtain a comparison between the parishes, each semi-commercial farm is evaluated on a similar basis to non-commercial holdings (supra, p.178). A change in the function of the farming system and its crop emphasis, however, necessitates altering the criteria by which this evaluation is made. The occupier of the 'average' semi-commercial farm is considered as simply one who possesses at least four tools and who applies fertilizer and mulch to his crops. Farmers who fail to meet these requirements are considered as 'below average'. A subjective judgment of farming methods and knowledge is made from observations of the

farmer's land, notably his kitchen garden, to determine whether an 'average' farmer could be considered as 'above average'. If a farmer exhibited a scientific knowledge of agriculture, by selecting the types of fertilizers he used, controlling disease and erosion, providing adequate shade and space for the optimum growth of his plants and observing the accepted methods of soil conservation, and whose farm has a hallmark of being an efficient and profitable concern, then he is considered to be 'above average'. Such farms are occupied by progressive farmers and are usually more diversified as they have several main crops and/or a secondary emphasis in livestock.

Of these farms 53 per cent are regarded as 'average', with 27 per cent 'above average' and 20 per cent 'below average' (Table 8.16). Farmers in St George's parish are again outstanding, as they have the highest proportion of farmers in the 'above average' category and the lowest in the 'below average', this despite the fact that the majority of

TABLE 8.16 SEMI-COMMERCIAL FARMS: EVALUATION OF LEVELS OF FARMING

Parish	No. of farms	Farming levels		
		Below average	Average	Above average
St George's	17	2	8	7
St John's	7	2	4	1
St Mark's	6	1	3	2
St Patrick's	16	3	10	3
St Andrew's	30	7	17	6
St David's	20	4	9	7
Total	96	19	51	26
% of semi-commercial farms	100	20	53	27

farmers have manual jobs. This phenomenon suggests the influence of the social-economic landscape upon these farmers. St Mark's and St David's parishes also have more farmers in the 'above' than the 'below' groups. The inverse, however, is the case in St John's and St Andrew's parishes and partly reflects the lack of education of the occupier, together with the adverse household structure in the former and the inexperience of the younger farmers in the latter.

Summary

Semi-commercial farmers, like their non-commercial counterparts, represent diverse elements of society, as both manual and non-manual workers are included. The manual workers are, however, more talented and economically motivated than those in the non-commercial category. They often regard the semi-commercial stage in farming as an important step towards their ultimate objective, economic independence. The quality of their farming practices is variable, and whether they are progressive or traditional in outlook depends upon their educational attainment and previous occupational experience. Those farmers with non-manual occupations are usually respected members of the community. They are better educated and have received their farming knowledge from formal sources, so that their farming practices are more efficient (although no more so than some of the progressive manual workers).

Export crops are the principal source of farm income in all parishes, save St George's where sugar cane is the main cash crop. Commercial food crop production, although relatively unimportant on semi-commercial farms, is best developed in St George's parish and to a lesser extent in

St David's and St Patrick's. An additional feature of farms in St George's and St David's, particularly those in the sugar cane belt along the south coast, is the larger number of livestock they support. Thus, semi-commercial farmers in St George's and St David's have a more diversified agricultural character than those in the other parishes. It is these two parishes, which together with St Mark's exhibit the best levels of farming practice, a result which was strongly foreshadowed by aspects of the social character of farmers in these parishes. Farmers who exhibit the best levels of farming are not necessarily those who are likely to become commercial farmers. The decision as to whether or not a semi-commercial farmer becomes independent depends on whether an individual considers he can increase his status and his income by concentrating his energies on farming. As will be evident from the following chapter, those who become commercial farmers are mainly manual workers.

CHAPTER 9

COMMERCIAL FARMERS

Introduction

The two previous chapters were concerned with farmers whose land is neither their main source of income, nor their main place of employment, and whose interest in agriculture is therefore divided. Another stage in the development of small scale farming is attained when a farmer becomes principally occupied in working and managing his own land for a livelihood. He has become a commercial farmer, which for most rural folk is to realize a life-long ambition, since it signifies independence in both an economic and social sense. This stage in farming is arrived at either by choice or ill-fortune, but in either case the commercial farmer is likely to have previously been a non-commercial or semi-commercial smallholder. For those who become commercial farmers by choice, their farms would have developed in size and production to the point where these farmers believed their land could support themselves and their families without the crutch of outside employment. A few farmers, although they receive the bulk of their income from the land, maintain a position of employment for reasons of security or status. A small number become commercial farmers by ill-fortune and they are often former semi-commercial farmers who for reasons of ill-health, redundancy, accident or age are no longer employable, and are

consequently forced to rely on their land for their income. This dichotomy in the origin of commercial farmers accounts for the few diversities which exist in this category.

As many commercial farmers were for some time either non-commercial or semi-commercial smallholders, it is possible to identify the types of persons most likely to progress in agriculture. This identification occupies the first part of the chapter and is followed by an examination of the nature of commercial farming.

The spatial and proportional distribution of commercial farms

The 118 commercial farms are distributed throughout the sample and exhibit no distinct pattern of location (Fig. 13). Any clustering of farms either reflects the distribution of rural settlement and the availability of land of a given size, which attracts farmers of appropriate economic means and farming interests, or occurs by chance. For these reasons a predominance of commercial farmers is found at Willis and Vendome in St George's parish, Mt Rich in St Patrick's, Mt Carmel and Munich in St Andrew's, and Westerhall Estate in St David's.

Commercial farmers represent the largest category in the survey and account for 41.5 per cent of all smallholders. They are the principal category in all parishes except St Mark's where they represent only 19 per cent (Table 7.1).

Social and economic characteristics

Previous occupational experience

Although the questionnaire failed to obtain data on the previous occupation of the farmer, this information was frequently given during the course of the interview and was noted in the case of 64 commercial farmers. Table 9.1 gives their previous occupational groups. While the results cannot be assumed to be entirely representative of the category, they do reveal that the proportion of those with backgrounds in manual occupations is greater than that in either of the previous two categories of farmers. Their dominant occupational group is that of skilled labourers, usually carpenters and masons, who enjoy the status of being an independent farmer, and who find that they can successfully

TABLE 9.1 COMMERCIAL FARMERS: PREVIOUS OCCUPATION IF KNOWN

		Occupational group						
Parish	Number of farmers	Estate worker	Unskilled labourer	Skilled labourer	Fisherman	Service industry	Civil service	Had no other employment, or not known
St George's	22	3	4	3	1	1	1	9
St John's	14	3	2	2	-	1	-	6
St Mark's	4	2	1	1	-	-	-	-
St Patrick's	19	2	2	4	-	-	-	11
St Andrew's	38	5	3	10	1	3	-	16
St David's	21	4	3	5	-	-	1	8
Total	118	19	16	25	2	5	2	50

transfer their skills to farming where their concern for detail and accuracy is important in the maintenance of crops. Some of these craftsmen would temporarily resume their trade when demands on their land are slack. More than half the former estate workers and unskilled labourers had held positions of some authority and so are the more educated, responsible and ambitious members of their occupational groups. The other estate workers and unskilled labourers represent the poorest element of commercial farming and many acquired what land they have through inheritance or marriage. Those with experience in service industries include shopkeepers and truckers, most of whom are still partly involved with their shop or in driving a truck. Both civil servants are retired, but depend upon farming for their livelihood.

The overall social character of commercial farmers is more homogeneous than either than of non- or semi-commercial farmers, as the large majority are manual workers. An interesting feature of their previous occupational experience is the higher proportion of those who are skilled labourers than estate workers, an indication that their higher wages offer greater opportunities for their becoming commercial farmers. As a rule, status as a commercial farmer is not determined by one's former occupation, but by the size of the farm and whether or not there is hired help on it. It is not until a farmer occupies about seven acres that his status becomes equivalent to that of most non-manual workers. Thus, commercial farmers have in general a lower status than semi-commercial farmers.

Education

Commercial farmers have the lowest level of educational attainment of any category, with an average standard of 3.96 (Table 9.2) as compared to that of the sample norm, 4.3. The proportion of those not having reached the first standard, 15 per cent, is, however, comparable to that for non- and semi-commercial farmers. It is indicative of their homogeneity of background that the range of mean education standard between the parishes is comparatively slight, as it varies from 3.36 in St John's to 5.00 in St David's.

TABLE 9.2 COMMERCIAL FARMERS: EDUCATIONAL ATTAINMENT

Parish	Number of farmers	Mean educational standard	Number of those not reaching 1st standard
St George's	22	4.14	4
St John's	14	3.36	3
St Mark's	4	3.50	1
St Patrick's	19	4.29	3
St Andrew's	38	3.49	7
St David's	21	5.00	-
Total	118	3.96	18
% of commercial farmers			15

Employment overseas

An undoubted asset in becoming a commercial farmer has been the opportunity to earn capital overseas, as 44 per cent of commercial farmers have had this experience. Most of them left Grenada with the intention of returning when they had accumulated sufficient capital for

them to get established as small farmers. The majority of those who went abroad were skilled labourers, whose talents were in demand throughout the Caribbean and the Rimland (Table 9.3). When working abroad they estimated that their wages were between three and eight times their equivalent in Grenada, so that after only a few years of frugal living they could return to purchase 2 or 3 acres and become a semi-commercial farmer, or after 10 or more years return to acquire enough land and become a commercial farmer. Experience overseas has thus been a useful catalyst in the process by which one becomes a commercial farmer.

TABLE 9.3 COMMERCIAL FARMERS: PLACE OF WORK ABROAD

Parish	Number of farmers	Place of work abroad: United Kingdom	North America	Aruba, Bonaire, Curacao	Trinidad	Latin America	Other West Indian islands	Total who worked abroad
St George's	22	-	1	1	6	3	-	9
St John's	14	1	1	-	3	3	1	6
St Mark's	4	1	1	1	1	1	-	2
St Patrick's	19	1	-	-	3	2	1	6
St Andrew's	38	2	1	1	11	2	3	19
St David's	21	1	-	3	7	1	1	10
Total	118	6	4	6	31	12	6	52
% of commercial farmers	100	5	3	5	27	10	5	44

Religion

In discussion of the previous farm categories Roman Catholics were observed to be principally those with manual occupations. Thus, among commercial farmers, where this occupational group predominates, it was anticipated that Roman Catholics would represent a correspondingly higher proportion. However, this is not so, as only 51 per cent of commercial farmers are adherents of this church, a proportion which is lower than that of both the previous categories. This result suggests that manual workers in the non- and semi-commercial categories who are Protestants are more likely to become commercial farmers than their Catholic counterparts. Apart from the Anglican church, the fundamentalist sects also have greater representation than their sample norm (Table 9.4). Followers of these sects attach great importance to working their

TABLE 9.4 COMMERCIAL FARMERS: CLASSIFICATION BY RELIGIOUS DENOMINATION

Parish	Number of farmers	Religious denomination							
		Roman Catholic	Anglican	Methodist	Presbyterian	Pentecostal	Seventh Day Adventist	Jehovah Witness	Baptist
St George's	22	9	7	4	-	-	1	1	-
St John's	14	6	3	-	1	-	3	-	1
St Mark's	4	-	2	-	1	-	1	-	-
St Patrick's	19	9	4	1	-	1	4	-	-
St Andrew's	38	22	12	-	-	1	1	-	2
St David's	21	14	2	-	-	2	1	2	-
Total	118	60	30	5	2	4	11	3	3
% of commercial farmers	100	51	25	4	2	3	9	3	3

own land, because they believe God to be their only master, so that when and where possible, no man should be in the employment of others, and therefore in their households the provision of services and amenities is often sacrificed until they become independent farmers. With respect to the distribution by parishes, only St Andrew's and St David's have a clear majority of Roman Catholics over Protestants.

Race

The distribution of commercial farmers by racial groups shows a higher proportion of negroes and a lower proportion of coloureds than that in the sample norm (compare Table 5.17 with Table 9.5).

TABLE 9.5 COMMERCIAL FARMERS: CLASSIFICATION BY RACIAL GROUP

Parish	Number of farmers	Number in racial groups			
		Negro	Coloured	East Indian	White
St George's	22	16	3	1	2
St John's	14	9	2	2	1
St Mark's	4	2	1	1	-
St Patrick's	19	13	6	-	-
St Andrew's	38	24	5	9	-
St David's	21	16	5	-	-
Total	118	80	23	12	3
% of commercial farmers	100	68	19	10	3

Negroes have previously shown a propensity for manual occupations, so their dominance is partly explained by the fact that the majority of these farmers had previously held such positions. Similarly, the association of coloureds with non-manual jobs accounts for the low representation of this racial group. A further explanation for the high proportion of negroes is that they have traditionally worked land and, whether consciously or unconsciously, have remained on it as a result of the colour-caste system (supra, p. 95). Thus, for the negro who is a skilled craftsman and a semi-commercial farmer, there is a strong attraction to become a commercial farmer, a position he considers to be his accepted place, while for the coloured craftsman, this attraction is less, as he would consider it more appropriate to ply his trade and remain a part-time farmer until such time as he could become the operator of a miniature estate, which he would regard as a position of suitable status.

The proportional distribution of East Indians and white corresponds to the norm for the sample and shows that the majority of East Indians are in St Andrew's parish, where a third of them are shopkeepers.

The household structure and character

Households of commercial farmers resemble those of non-commercial smallholders in that they have certain symptoms of instability, notably an above-average proportion of female headships, 22 per cent, and a below-average proportion of married farmers, 59 per cent. These two categories of farmers differ in age structure, however, as 34 per cent of the commercial farmers are over 64 years, 51 per cent

between 45 and 64, and only 15 per cent under 45, with their average age being 54.0 years (Table 9.6). The fact that a farmer does not acquire the status of a commercial farmer until he is in his mid-fifties, has contributed to the proportion of widowed heads of households, 17 per cent; three-quarters of these are widows who inherited their farm from their husband. A comparison between the marital status of semi-commercial and commercial farmers (Tables 8.6 and 9.6) shows that although commercial farmers are older, a greater proportion of them have never been married, 19 per

TABLE 9.6 COMMERCIAL FARMERS: AGE, SEX, AND MARITAL STATUS

Parish	Number of farmers	Age in years	Sex		Marital status			
			Male	Female	Single	Married	Widowed	Separated
St George's	22	54.9	19	3	3	11	6	2
St John's	14	60.0	9	5	1	10	3	-
St Mark's	4	59.5	4	-	2	1	1	-
St Patrick's	19	51.2	11	8	9	5	5	-
St Andrew's	38	59.1	32	6	3	28	5	2
St David's	21	50.5	17	4	4	14	1	2
Total	118	54.0	92	26	22	69	20	6
% of commercial farmers	100		78	22	19	59	17	5

cent. This observation indicates that commercial farmers on the whole are of lower social status than semi-commercial farmers (supra, p. 190).

Of the parishes, St Patrick's again has a distinctive household structure, in that it has the highest proportion of female headships, 8 out of 19, and the highest proportion of farmers who are not, or are no longer, married, 14 out of 19. It is therefore predictable that the nature and level of farming in St Patrick's will be influenced by this structure.

Levels of living

The significance of the level of living index for commercial farmers, .27, is that it confirms the view that these farmers are of lower social standing than those in the semi-commercial category. This fact suggests that it is either the poorer element of semi-commercial farmers who become commercial farmers, or that the purchasing of land in order to become independent has had priority over the acquisition of household goods which would have raised their level of living. A further indication of the homogeneity in the background of commercial farmers is revealed by the small discrepancy between the indices of the individual parishes, which vary from .21 in St John's, to .30 in St Mark's (Table 9.7). It is this uniformity in character, however, which implies that the typical commercial farmer is better-off than the average non-commercial smallholder, despite the comparability of their indices. The non-commercial category has an index which

is inflated by the affluence of a few, so that a comparison between these two categories with respect to household conveniences and services (Tables 7.8 and 9.7) reveals that a greater proportion of commercial farmers have basic household items and indicates that the average commercial farmer enjoys a higher level of living than his non-commercial counterpart.

TABLE 9.7 COMMERCIAL FARMERS: LEVELS OF LIVING AS INDICATED BY POSSESSION OF CONVENIENCES AND GOODS

		Conveniences and goods								
Parish	Number of farms	Electricity	Sewerage	Plumbing	Gas stove	Refrigerator	Radio	Telephone	Motor vehicle	Index of occurrence
St George's	22	4	3	10	11	6	15	1	1	.29
St John's	14	1	-	3	6	1	11	-	1	.21
St Mark's	4	1	1	2	1	1	4	-	1	.30
St Patrick's	19	3	2	5	9	4	13	-	1	.24
St Andrew's	38	5	7	18	23	5	29	1	1	.29
St David's	21	4	1	9	11	2	19	-	1	.28
Total	118	18	14	47	61	19	91	2	6	.27
% of commercial farmers	100	15	12	40	52	16	77	2	5	

Summary

Although commercial farmers represent the largest category in the survey, they have the most homogeneous character in terms of social and economic achievements. Their background is one of little formal education and it is by their previous experience at manual jobs, often as artisans, that they have been enabled to accumulate capital and purchase their own lands. If they remained in Grenada they usually did not become economically independent until they were in their late 50s, but by seeking employment overseas some were able to save more quickly and become commercial farmers by the time they were 45 years of age. The process by which they become commercial farmers is often a gradual one, as many of these people pass through both the non-commercial and semi-commercial stages before they place total reliance on farming for their livelihood. Consequently these farmers are older and more experienced than those in the other categories. Of those in the non-commercial and semi-commercial categories, it is particularly the more ambitious, responsible and skilled members of the manual workers who achieve commercial status. They are still predominantly negro, have a household structure less stable than that of semi-commercial farmers and a level of living below that of semi-commercial farmers. In as much as they are likely to be Protestant or Roman Catholic, it is inferred that non-commercial farmers who are Protestants will more probably become commercial farmers than those who are Roman Catholics.

As commercial farmers depend upon their land for their livelihood, they can be expected to make greater investment and take greater

interest in agriculture than farmers who are either non-commercial or semi-commercial. Thus, the nature of their farming should reflect this outlook, as well as the previously noted social characteristics of the farmers.

The agricultural unit

As the commercial farm is usually a development from the semi-commercial farm, its general character is similar and the terms 'progressive' and 'traditional' have the same connotation (supra, p.193). By using the same criteria of education and experience overseas, 56 per cent are considered 'progressive' in outlook, and the remainder 'traditional' in their approach to agriculture. This division represents an increase in the 'progressive' proportion over that of the semi-commercial category and suggests that this attitude is important in realizing commercial status.

Size, fragmentation and tenure of holdings

Commercial farms illustrate their growth from the previous category by an increase in farm size, a higher degree of fragmentation, and a greater proportion of land which is occupied freehold. This pattern of growth, therefore, maintains the sequence noted between non-commercial and semi-commercial holdings.

The average size of commercial farms is 4.08 acres, or an increase of 52 per cent over that of semi-commercial farms. Variation in the average size of farms (Table 9.8) reflects the availability of land, the nature of farm production and the financial resources of the farmers.

Thus, in St Patrick's parish, which has a comparatively low level of living and has been noted for its unstable household structure, farms have the smallest size in this category. Evidence of the gradual growth of commercial farms is provided by the number of parcels of land comprising each agricultural unit, which average 2.76 fragments, or .63 fragment more than for semi-commercial farms. No farm consists of more than seven fragments, and 78 per cent of these farms have fewer than four fragments (Table 9.8).

The increase in farm size is achieved through the purchase of additional fragments. This purchase results in a larger proportion of the farms being owner occupied than was the case on semi-commercial farms. Of these holdings, 77 per cent are owned, with the remainder being rented, 17 per cent, held in trusteeship, 4 per cent, and sharecropped, 2 per cent (Table 7.10). The major difference in this tenurial

TABLE 9.8 COMMERCIAL FARMS: CHARACTERISTICS OF THE FARMS

		Characteristics			
Parish	Number of farms	Mean number of fragments	Mean size of farm (acres)	Mean size of cultivated land (acres)	% cultivated land of total land
St George's	22	2.50	4.30	3.17	74
St John's	14	3.43	4.08	3.18	78
St Mark's	4	3.00	5.44	4.19	77
St Patrick's	19	2.31	3.28	2.88	88
St Andrew's	38	2.74	4.16	3.17	76
St David's	21	2.95	4.17	3.86	92
Total	118	2.76	4.08	3.28	80

pattern over the previous ones for non- and semi-commercial farms is the absence of provision grounds on estate land. This privilege is withdrawn when an estate worker terminates his employment. The same is not true for share-cropping, however, as current association with a sugar cane estate is not required in order for a farmer to undertake this arrangement. Only in St John's parish does the tenurial pattern differ markedly, as 46 per cent of the land is rented by commercial farmers, indicating either that some of them are too poor to purchase all the land they work or that there are local difficulties in buying fragments.

It is a combination of these reasons that account for differences in the proportion of cultivated land on farms in their various parishes (Table 9.8).

Aspects and methods of cultivation

The difference in size and fragmentation between commercial and semi-commercial does not affect the regional pattern of crop production or the general farming methods. Therefore bananas and nutmegs are the predominant crops on land above 800 feet, while below this elevation bananas and cocoa prevail. Food crop production, especially of vegetables, is found where conditions of soil, slope, climate and market are favourable, namely in St George's parish. 'Progressive' farmers manage their land in the same way as their counterparts on semi-commercial farms, while 'traditional' farmers are still negligent or ignorant of scientific methods of cultivation. There are, however, differences between these two categories and these differences become evident in the subsequent analysis of land use, crop production and livestock emphasis.

Land use

Vegetable crops

The index of occurrence for vegetables on the various fragments follows the trend established in the previous farm categories, that of decreasing as the number of the fragment increases (Table 9.9). Kitchen gardens are still an integral part of F1, and it is the distribution and occurrence of vegetables in them which provides another indicator of the social status of commercial farmers. As their index of occurrence for F1, .21, is lower than that for kitchen gardens on semi-commercial farms, but comparable to that on non-commercial holdings, it suggests that commercial farmers are generally of lower social status and have less sophisticated tastes than semi-commercial farmers. This fact is borne out by comparison of crops grown (Tables 8.9 and 9.9) whereby commercial farmers have fewer root crops and leaf vegetables, their emphasis being on stable food crops, such as pigeon peas, yams, tannias, dasheen and sweet potatoes.

Despite this generalization and the homogeneity in background of commercial farmers, variation does exist between the parishes in the nature of their kitchen gardens. St Mark's parish which has previously been noted as being unsuitable for kitchen garden development (supra, p.200) has the lowest index, .07, and produces only 6 types of vegetables, mainly ground provisions. In those parishes which are more suited for growing vegetables and whose semi-commercial farmers engage in some food crop production, notably St George's, St Patrick's and St David's, indices of occurrence and number of different

TABLE 9.9 COMMERCIAL FARMS: VEGETABLE CROP OCCURRENCE

Parish	Fragment number	Number of fragments	Tropical roots & tubers							Temperate roots				Green leaf		
					Ground provisions											
			Arrowroot	Cassava	Dasheen	Eddoes	Sweet potatoes	Tannias	Yams	Beetroot	Carrots	Onions	Radishes	Cabbages	Celery	Lettuce
St George's	1	24	1	14	9	7	8	12	17	2	6	-	-	4	1	5
	2	17	-	3	4	1	8	3	7	-	2	-	-	1	1	-
	3	10	-	-	2	-	2	2	3	-	1	-	-	1	-	-
	4	4	-	2	2	1	2	3	2	1	1	-	-	-	1	1
	5	1	-	-	-	-	1	1	1	1	1	-	-	-	-	-
St John's	1	14	-	-	5	-	2	9	8	-	1	-	-	2	-	5
	2	14	-	-	5	-	3	9	6	1	-	-	1	3	-	1
	3	10	-	-	3	2	2	1	5	-	2	-	-	-	-	2
	4	5	-	1	2	-	1	2	2	-	-	-	-	1	-	1
	5	4	-	-	-	-	1	1	1	-	-	-	-	2	1	1
	6	1	-	-	1	-	-	1	1	-	-	-	-	-	-	-
St Mark's	1	4	-	-	-	1	-	2	2	-	-	-	-	-	-	1
	2	4	-	-	1	-	1	3	3	-	-	-	-	-	-	-
	3	3	-	-	1	-	-	2	2	-	-	-	-	1	-	-
	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St Patrick's	1	19	-	8	6	2	6	11	15	1	-	-	1	3	1	2
	2	12	-	4	2	1	4	5	7	1	-	-	-	1	-	-
	3	8	-	-	-	-	-	1	1	-	-	-	-	-	-	-
	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5	4	-	-	-	-	1	-	-	-	-	-	-	-	-	-
St Andrew's	1	38	-	3	20	-	18	21	18	-	-	-	-	5	1	7
	2	33	-	6	12	2	4	15	17	-	-	-	-	2	-	-
	3	21	-	6	5	1	5	10	10	-	-	-	-	1	-	1
	4	10	-	1	3	-	-	-	3	-	-	-	-	-	-	-
	5	4	-	-	1	-	1	1	1	-	-	-	-	-	-	-
	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St David's	1	21	-	8	10	3	11	16	18	1	1	-	1	3	2	7
	2	17	-	6	2	2	4	7	9	-	1	-	-	3	1	1
	3	11	-	1	2	2	4	5	5	-	-	-	-	1	-	-
	4	7	-	3	1	-	-	1	3	-	-	-	-	-	-	1
	5	5	-	-	1	-	1	1	3	-	-	-	-	-	-	-
	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-
Total	1	118	1	33	50	13	45	71	78	4	8	-	2	17	5	27
	2	97	-	19	14	13	24	42	49	1	3	-	1	10	2	2
	3	59	-	7	13	13	13	21	26	-	3	-	-	4	-	3
	4	33	-	7	5	1	3	6	10	1	1	-	-	1	1	3
	5	20	-	1	3	-	2	4	6	1	1	-	-	2	-	1
	6	3	-	-	1	-	-	1	2	-	-	-	-	-	-	-
	7	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-

TABLE 9.9

Parish	Fruit and pod											Others		Index of occurrence	Number of different crops
	Corn	Cow peas	Cucumbers	French beans	Groundnuts	Melogene	Okra	Peppers	Pigeon peas	Pumpkins and melons	Tomatoes	Seasoning	Sugar cane		
St George's	13	2	8	3	-	3	11	11	17	2	13	5	8	.28	24
	6	1	1	2	1	-	4	1	9	-	1	4	7	.15	21
	1	-	-	-	-	-	-	1	3	-	1	-	2	.07	12
	-	1	1	2	-	-	2	1	2	-	2	2	-	.09	18
	-	1	-	-	-	1	1	1	1	1	1	1	-	.48	13
St John's	1	-	1	1	-	1	3	4	7	1	3	-	-	.14	16
	3	-	5	1	-	-	3	2	4	-	4	1	-	.14	16
	2	-	1	2	-	-	-	1	3	1	3	1	-	.11	15
	1	-	2	1	-	-	-	-	3	-	2	1	-	.15	13
	1	-	1	1	-	1	1	-	1	1	1	-	-	.14	13
	-	-	-	-	-	-	-	-	-	-	-	-	-	.11	3
St Mark's	2	-	-	-	-	2	1	-	-	-	1	-	-	.07	6
	-	-	-	-	-	-	1	-	2	-	-	-	-	.10	7
	-	-	2	-	-	-	1	-	1	-	2	-	-	.16	9
	-	-	1	-	-	-	-	1	-	-	-	-	-	.07	2
St Patrick's	15	3	3	6	-	2	7	11	17	-	12	4	3	.27	22
	6	-	2	2	-	-	1	1	9	-	3	-	-	.15	15
	-	-	-	-	-	-	-	-	-	-	-	-	-	.02	2
	1	-	-	-	-	-	-	-	1	-	-	-	-	.08	2
	1	-	-	-	-	-	-	-	1	-	-	-	1	.03	4
St Andrew's	12	1	8	7	-	1	12	6	25	-	11	3	1	.18	19
	13	4	5	4	-	-	2	2	18	-	7	2	1	.13	17
	8	3	6	4	1	2	5	1	9	-	3	-	-	.14	18
	1	-	-	-	-	-	-	-	1	-	-	-	-	.03	5
	-	-	1	1	-	-	-	-	-	-	-	-	-	.02	6
	1	1	-	1	-	-	-	-	1	-	-	-	1	.19	5
St David's	16	4	8	10	1	4	14	11	17	3	12	6	6	.38	25
	8	1	3	3	-	2	4	2	8	-	6	1	5	.17	21
	2	-	2	3	-	1	-	1	3	1	3	1	2	.13	17
	3	1	1	1	-	-	-	-	3	-	2	-	-	.11	11
	1	-	-	-	-	-	-	-	1	-	-	-	-	.04	6
	-	-	-	-	-	-	-	-	-	-	-	-	-	.00	-
	-	-	-	-	-	-	-	-	1	-	-	-	-	.11	3
Total	47	7	28	27	1	18	47	43	83	6	52	11	18	.21	26
	46	6	16	12	1	8	15	8	50	-	21	2	14	.15	24
	14	3	11	11	1	2	6	4	19	2	12	3	4	.12	22
	6	1	5	4	-	3	2	2	10	-	6	-	-	.10	20
	3	2	2	2	-	1	2	1	4	2	2	2	5	.09	21
	-	-	-	-	-	-	-	-	-	-	-	-	-	.05	2
	-	-	-	-	-	-	-	-	-	-	-	-	-	.11	3

vegetables grown on F1 are comparatively high (Table 9.9).

Subsequent fragments on commercial holdings possess some similarity with respect to the distribution of vegetable crops in their provision grounds to their corresponding numbered fragment on semi-commercial farms (compare Table 8.9 with Table 9.9). For example, F2 and F3 on both categories of farms have comparable indices of occurrence and number of different crops cultivated on them. The variety of crops is similar, as they both have a dominance of ground provisions, corn and pigeon peas. Other crops may be cultivated although their occurrence will reflect either the needs of the farmer, the nature of his farming, or the absence of petty thieving in the area where his fragment is located so that he can produce more valuable vegetables with impunity. On the fragments which can be considered as representing the growth of commercial farms from their semi-commercial stage, namely on F4 and above, the character of the provision ground is similar, although the importance of its role is reduced, since it occupies a smaller part of the whole fragment. There are two exceptions to this overall pattern for provision grounds and these are in the parishes of St John's and St Mark's, where for higher numbered fragments, there is no appreciable drop in the indices of occurrence or in the number of different crops grown. The explanation for these anomalies lies partly in the fact that kitchen gardens in these parishes contain few vegetables, so that a need arises for provision grounds to substantially augment their production. The nature of their provision grounds is similar to the overall pattern, but in relation to F1 it contains either a similar variety and number of crops or in the case of St Mark's parish even more.

Farmers who specialize in vegetable gardening cultivate a wide variety of vegetables on suitably flat and fertile land other than that of their housespot. Such fragments are either located where praedial larceny is not considered a serious problem, or where a friend or relative can guard against this crime. An example of this is F5 in St George's (Table 9.9).

Commercial farmers do not generally display the desire or aptitude to grow the same variety and number of vegetables as semi-commercial farmers. This fact is due to their lower level of education, from which is inferred a limited knowledge about the cultivation of vegetables and less refined dietary tastes connected with their lower social and economic status. Even progressive farmers, especially those with experience overseas, regard vegetable gardening with some degree of scorn, since they consider that there is little social status in performing the back-breaking tasks of growing tomatoes or lettuce under a fierce sun, when they like to think that they could afford to buy them in the market. Consequently progressive farmers tend to concentrate on export crops.

Tree crops

Indices of occurrence of tree crops do not have the regular decrease with increase in fragment number that typifies tree crops on semi-commercial farms. While a downward trend is evidenced for the indices of F1 through F5, F6 and F7 offset this pattern although their sample size is too small to permit any meaningful inference (Table 9.10).

That the index of occurrence for F1, .49, is lower than that on the corresponding fragment on semi-commercial farms, .55, is a further

TABLE 9.10 COMMERCIAL FARMS: TREE CROP OCCURRENCE

Parish	Fragment no.	No. of fragments	Avocado pear	Bananas	Breadfruit	Cocoa	Coconut	Lime	Other citrus	Mango	Nutmegs	Sapodilla	Other fruits	Index of occurrence
St George's	1	24	11	19	11	8	20	5	13	17	5	-	19	.45
	2	17	6	5	4	3	10	3	2	7	4	-	3	.25
	3	10	2	5	2	5	2	-	2	5	4	2	-	.26
	4	4	2	2	2	1	4	-	-	4	3	1	1	.45
	5	1	-	1	1	-	-	-	1	-	-	-	-	.27
St John's	1	14	3	12	8	8	8	-	8	4	9	-	4	.41
	2	14	5	11	6	9	6	2	8	4	11	1	2	.41
	3	10	3	8	6	7	4	1	3	4	7	1	2	.42
	4	5	2	5	3	1	2	-	2	2	2	-	-	.22
	5	4	-	3	-	-	1	-	-	-	1	-	-	.11
	6	1	-	-	-	1	1	-	-	-	1	-	-	.27
St Mark's	1	4	4	4	2	3	4	1	3	3	2	-	-	.59
	2	4	2	3	1	1	3	1	-	1	2	1	1	.36
	3	3	2	3	1	-	1	-	1	1	1	-	1	.33
	4	1	1	1	1	1	1	-	1	1	-	1	1	.82
St Patrick's	1	19	18	18	14	15	15	6	10	13	11	1	5	.51
	2	12	4	10	9	10	9	1	6	7	9	-	-	.49
	3	8	-	4	-	1	3	-	1	1	1	1	1	.15
	4	6	-	1	1	1	1	-	-	1	-	-	-	.08
	5	4	1	-	-	1	-	-	1	1	-	-	-	.09
St Andrew's	1	38	15	33	31	31	29	4	17	25	22	2	5	.49
	2	33	12	28	15	25	19	2	8	13	19	2	3	.40
	3	21	8	10	10	12	13	2	5	9	12	1	2	.36
	4	10	2	7	6	5	3	-	4	4	8	-	-	.35
	5	4	-	1	2	1	1	-	-	3	2	-	-	.22
	6	1	-	1	-	1	-	-	-	-	-	-	-	.27
St David's	1	21	11	19	16	17	17	4	10	16	8	2	3	.53
	2	17	4	9	10	11	10	4	3	11	5	1	2	.37
	3	11	2	7	5	6	6	-	1	6	6	2	1	.34
	4	7	4	7	5	5	5	-	-	4	7	-	1	.49
	5	5	-	3	3	2	2	-	1	1	4	1	1	.33
	6	1	-	1	-	1	1	-	-	-	1	-	1	.45
	7	1	-	1	-	-	1	-	-	-	1	-	1	.36

TABLE 9.10

	Fragment no.	No. of fragments	Avocado pear	Bananas	Breadfruit	Cocoa	Coconut	Lime	Other citrus	Mango	Nutmegs	Sapodilla	Other fruits	Index of occurrence
Total	1	118	61	105	81	92	79	21	61	68	57	5	26	.49
	2	97	31	66	45	68	58	13	27	55	50	5	11	.40
	3	59	15	37	24	29	31	3	13	26	31	7	6	.35
	4	33	10	23	18	16	14	-	7	16	20	1	2	.35
	5	20	1	9	6	4	5	-	2	6	7	1	1	.19
	6	3	-	2	-	3	3	-	2	1	3	-	1	.45
	7	1	-	1	-	-	1	-	-	-	1	-	1	.36

illustration of the social and economic differences between these two groups of farmers. Although bananas, coconut, breadfruit and cocoa are the dominant tree crops on both, commercial farmers grow fewer of the prized fruits, such as mango, citrus, sapodillas and pawpaws (compare Table 8.10 with Table 9.10). It is St Mark's parish which again has the highest index of occurrence, .59, thereby compensating for the poor distribution of vegetables in its kitchen gardens.

Export crops are the dominating feature on subsequent numbered fragments, but they are interspersed by the occasional coconut, breadfruit and mango tree. On F3 and higher numbered fragments the most commonly occurring trees are bananas and nutmegs, signifying that such fragments are often of higher elevation than F1 and F2 and therefore less suited to the cultivation of cocoa. A notable feature of St George's parish is its relatively low indices of occurrence of tree

crops on F2 and F3. The fact that trees are less important on these fragments is due partly to the importance of sugar cane, which is grown on the drier parts of the island where few tree crops except limes are found, and partly to vegetable gardening which characterises production on commercial farms in this parish. A feature of the farms in St Patrick's parish is the absence of tree and vegetable crops on F3, F4 and F5. These fragments are either recently acquired, in which case they will receive more intensive agricultural use, or the small, poorly-worked parcels of land belonging to women who are unable to give them adequate attention.

Cash crops

Production on commercial farms resembles that on semi-commercial farms, as export crops account for 72 per cent of the principal cash crops, food crops, 17 per cent, and cane, 9 per cent. Cocoa remains the dominant cash crop and is the major source of agricultural income on 35 per cent of these farms. Of subsequent importance are nutmeg, 27 per cent, and bananas, 10 per cent (Table 9.11). There is a difference, however, in the nature of crop emphasis between these two types of farms, in that the order of relative importance between nutmeg and bananas is reversed from that on semi-commercial farms (Table 8.11). The variation reflects differences in the social structure between these two types of farmers, namely the age both of the farmer and of his farm. As commercial farms developed, bananas would have been planted in conjunction with cocoa, as the cocoa became established, bananas dwindled in importance. For farmers, especially the

TABLE 9.11 COMMERCIAL FARMS: PRINCIPAL CASH CROPS

Parish	Export crops: Bananas	Cocoa	Nutmegs	Limes	Coconuts	Cane	Ground provisions	Beans, corn, peas	Leaf and salad veg.	Temperate root crops	Other fruits	None
Principal cash crop												
St George's	-	4	1	2	-	5	3	2	5	-	-	-
St John's	3	2	7	-	-	-	-	-	2	-	-	-
St Mark's	-	2	2	-	-	-	-	-	-	-	-	-
St Patrick's	2	10	4	-	-	-	-	3	-	-	-	-
St Andrew's	7	16	13	-	-	-	2	-	-	-	-	-
St David's	-	7	4	-	2	5	1	1	1	-	-	-
Total	12	41	31	2	2	10	6	6	8	-	-	-
% of total	10	35	27	2	2	9	5	5	7	-	-	-
Second cash crop												
St George's	-	1	5	-	-	1	2	5	2	1	2	3
St John's	2	5	5	-	-	-	-	-	1	-	1	-
St Mark's	2	1	-	-	-	-	-	-	-	-	1	-
St Patrick's	3	5	7	-	-	-	3	-	-	-	-	1
St Andrew's	10	10	12	-	-	-	-	-	-	-	1	4
St David's	3	8	4	-	-	1	1	1	-	-	-	2
Total	20	30	33	-	-	2	6	6	3	1	5	10
% of total	17	26	28	-	-	2	5	5	3	1	4	9
Third cash crop												
St George's	1	1	-	-	-	1	3	4	2	1	2	7
St John's	2	3	-	-	-	-	5	-	-	-	-	4
St Mark's	1	1	-	-	-	-	-	1	1	-	-	-
St Patrick's	8	2	4	1	1	-	1	-	-	-	-	2
St Andrew's	6	8	8	-	-	-	2	3	-	-	-	11
St David's	4	1	5	-	-	2	4	2	-	-	-	3
Total	22	16	17									
% of total	19	14	14	1	1	3	13	8	3	1	2	23

older ones, the production of cocoa is popular as it enables the farmer to be more independent and flexible in his operation, for management of cocoa is less demanding of time and energy than is management of bananas. In addition, the farmer is not tied down by the weekly routine of cutting and carrying of banana stems, which is not only strenuous, but the cause of many pulled muscles among the older farmers. Consequently, bananas are regarded as a young man's crop, so that it is a less popular crop among commercial farmers than it is with the generally younger, semi-commercial farmers. In no parish is the banana crop a more important source of income than either cocoa or nutmegs.

The diversity of production noted among semi-commercial farmers in St George's parish is maintained amongst its commercial farmers, as the sale of vegetable crops and cane is more important than that of export crops. More than half its commercial farmers sell vegetables, mainly those of the leaf and salad type, and ground provisions. This parish, together with St David's, account for all the producers of sugar cane. It is these two parishes where farm production is most heterogeneous.

Of the 84 farmers who sell export crops as their principal crop, 76, or 90 per cent, have another export crop as their second cash crop and only 2 have no second crop. Of those naming cocoa in the first instance, more than half, 53 per cent, have nutmegs as their second crop, while of those naming nutmegs, 70 per cent have cocoa. Farmers with bananas as their main crop, have cocoa or vegetables as their second. Amongst vegetable producers, 60 per cent name another class of vegetable as their second crop. Producers with sugar cane as

their main crop have a variety of second crops, including cocoa, coconut and vegetables, although four have no second crop. Thus, the differences between the first-named cash crop and the second is a decrease in emphasis on cocoa and sugar cane with an increase on bananas (Table 9.11).

A major distinction between semi-commercial and commercial farmers is the greater proportion of commercial farmers who sell a third crop, 77 per cent as against 46 per cent. This difference is a direct result of their dependence upon the land and the need for diversity of production in order to minimize economic insecurity. For their third cash crop, 55, or 47 per cent, farmers name export crops, mainly bananas, so that one-third of all commercial farmers sell all three export crops (Table 9.11). Vegetables become more important as a third cash crop and supplement income from export crops, for a very good reason. Besides diversifying production, vegetables provide a regular source of petty cash through their weekly sale in the market. The sale of nutmegs and cocoa does not provide a regular source of cash, as the bulk sale of these crops is determined by the time of harvest for these trees and made at long intervals throughout the year.

From Table 9.11 it is seen that vegetable gardening is best developed in St George's parish. The principal areas of this specialization are Willis, Constantine, New Hampshire and Mt Moritz, where the Woburn soil, with its gentle slopes (Figs. 7 and 8), and a suitable annual rainfall regime provide conditions in which a variety of crops can be grown, many on a year-round basis. Farmers who specialize in market gardening often employ intensive and progressive methods of cultivation, and grow a variety of crops, as illustrated by Figure 17.

Plan of market garden on commercial farm in Constantine, St. George's

BASED ON FIELD SKETCH

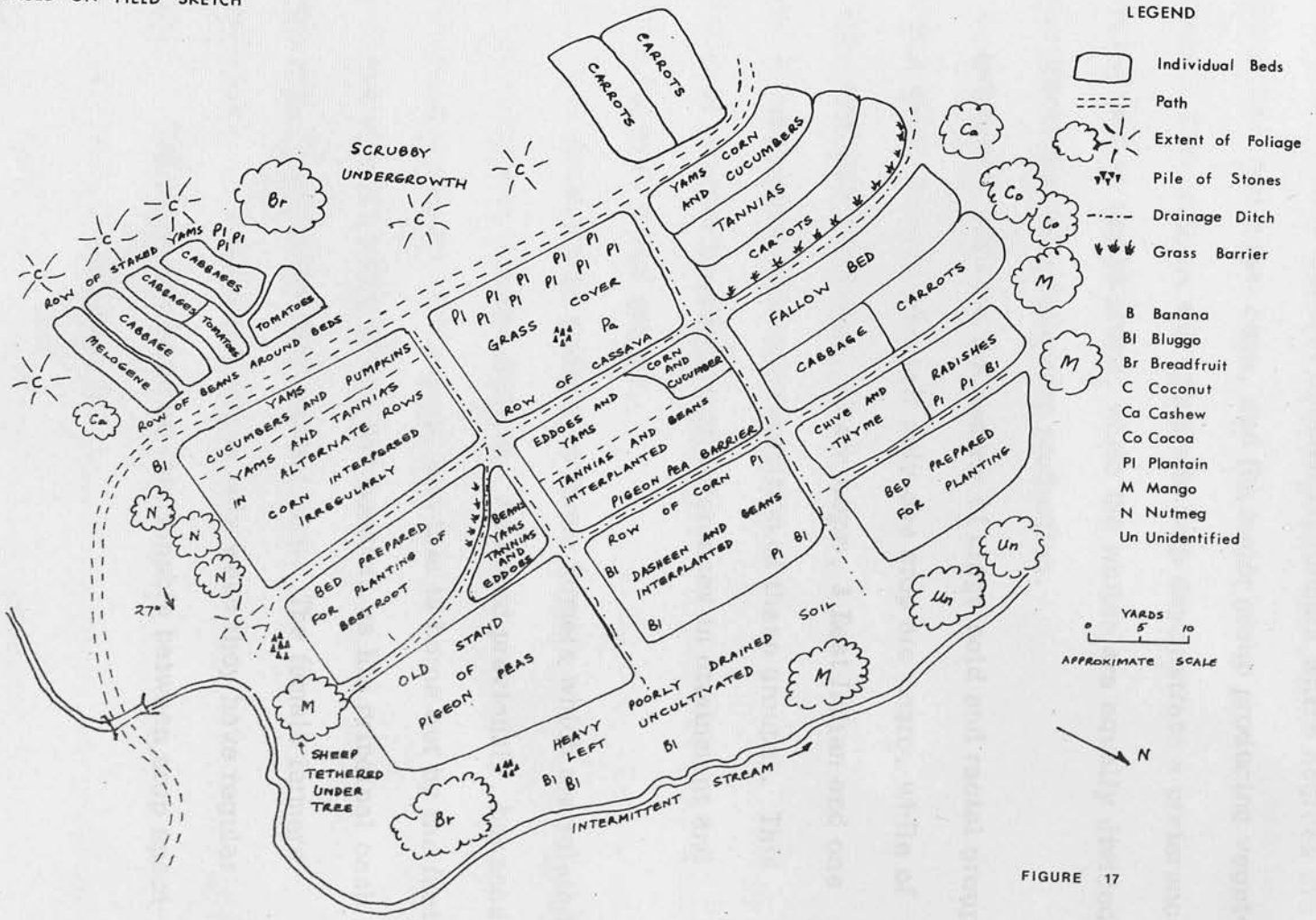

FIGURE 17

Social aspects of crop cultivation

A characteristic of semi-commercial farms is the association between racial groups and the production of specific crops. This association remains evident amongst commercial farmers where negroes are the only group who sell sugar cane, and the major group producing vegetable crops. East Indians and coloureds both demonstrate a preference for specializing in export crops, while the whites are equally divided between export and vegetable crop production.

A comparison between the number of crops sold and racial groups shows that those farmers who sell only one crop are negro, while of those who sold only two crops, 23 are negro, 3 East Indian and one coloured (a disproportionate representation of these groups). This comparison is another illustration of differences in attainment and motivation between racial groups.

The only other social aspects of these farmers which are related to crop specialization are age and sex. As noted previously, bananas are considered a younger man's crop, and this is borne out by the fact that no farmer over 64 years of age has bananas as his principal cash crop, and only 2 have it as their second crop. The female farmers grow sugar cane and cultivate bananas only when they have regular hired labour. There appears to be no relationship between crop specialization and education or religion.

Livestock

Livestock are not, surprisingly, as important a feature on commercial farms as they are on semi-commercial farms. This

diminished importance is indicated by comparison of household ratios of animals between these farm categories (Tables 8.12 and Table 9.12). While the number of fowls is similar, only pigs and donkeys (manure and draught) are more common on commercial farms than on semi-commercial holdings. The fact that pigs are more numerous is indicative of the lower social status of commercial farmers, since this animal is a substitute for more highly-prized livestock, such as cattle, goats and sheep, which require closer supervision. Donkeys are, however, more numerous, because the increase in farm size and fragmentation has resulted in a greater demand for their services, especially as draught animals. The major difference between these two categories of farms is the smaller ratio of quality livestock per household, notably of sheep and meat goats and, to a lesser extent, of beef and dairy cattle, which are found on commercial farms. Not only does this illustrate a decline in the prosperity of these farmers, but also the lack of interest among older farmers to keep livestock which require more management than they are either prepared or able to give.

St George's remains the outstanding parish for its number of livestock, which is a feature of farms, both in cane growing and vegetable producing areas. It is the only parish where the number of cattle and sheep exceeds that of pigs. The presence of these animals as a source of manure, and the production of vegetables which can be readily carried by the farmer, make the donkey redundant, hence its general absence in St George's parish. Farmers in St Andrew's parish have few livestock, and the reason given for not keeping sheep, goats and cattle is the high incidence of thievery.

TABLE 9.12 COMMERCIAL FARMS: NUMBER AND DISTRIBUTION OF LIVESTOCK

Parish	No. of farms	Fowls/household	Dairy cattle	Beef cattle	Milch goats	Meat goats	Pigs	Sheep	Draught donkeys	Manure donkeys
			Number of livestock							
St George's	22	7.2	15	14	2	4	12	13	2	1
St John's	14	8.3	2	3	5	7	9	-	6	3
St Mark's	4	12.0	-	-	-	3	2	1	1	-
St Patrick's	19	12.0	6	5	2	2	16	13	5	1
St Andrew's	38	7.6	5	1	5	-	36	1	14	10
St David's	21	20.1	7	5	2	7	21	2	5	6
Total	118	9.1	35	28	16	23	96	30	33	21
Ratio/household			.30	.24	.13	.19	.81	.25	.28	.18
			Number of farms with livestock							
St George's			14	14	9	1	3	9	5	2	1
St John's			10	2	2	5	4	3	-	6	3
St Mark's			3	-	-	-	1	2	1	1	-
St Patrick's			17	6	4	2	2	5	4	5	1
St Andrew's			28	5	1	4	-	18	1	14	9
St David's			18	6	4	1	5	11	2	5	5
Total			90	33	20	13	15	48	13	33	19
Percentage of commercial farms			77	28	17	11	13	41	11	28	16

Other characteristics of commercial farms

Sources of farming knowledge

With the increase in farm size formal sources of farming knowledge become more important and 67 per cent of commercial farmers have contact with their extension instructor. Those farmers not having this contact have usually less than 2 acres of land, and prior to becoming commercial farmers had worked on estates where they acquired basic knowledge in the cultivation of export crops. In contrast, those who came to farming after having worked overseas had only limited or no experience with the cultivation of export crops and, consequently, sought the advice of their extension instructor. Their lack of formal education and their commitment to the land for their source of income have made commercial farmers more receptive to the extension service. Despite this contact, relatively few farmers openly admit to learning about farming from this source, mainly because the instructor is considered useful to help them to obtain subsidies for fertilizers, quality seedlings and the construction of drainage ditches and grass barriers, rather than with teaching the methods of, or reasons behind, successful cultivation.

Commercial farmers, however, still rely on traditional and informal sources of farming knowledge. Eighty-three per cent of them recognise the influence of their parents on their farming practices, especially in the cultivation of vegetable crops. Estate experience and lessons learnt from friends and neighbours are other sources identified by one-third of these farmers. Belief in the importance of the phases of the

moon is greater than among semi- and non-commercial farmers, as 82 per cent are influenced by it and use MacDonald's Almanac. Sources of farming knowledge are therefore a curious mixture of influences which help to explain the presence of both progressive and traditional practices on the same farm.

Farming practices

Whereas many of the characteristics of commercial farms have been regarded as being of a lower standard than those of semi-commercial farms, there is comparable use of fertilizer and application of mulch (Table 8.13 and Table 9.13). In view of the inferior educational attainment of commercial farmers, this achievement is surprising, but it is one which reflects the commercial farmer's progressive attitude,

TABLE 9.13 COMMERCIAL FARMS: USE OF FERTILIZER AND PRACTICE OF MULCHING

Parish	Number of farms	Type of fertilizer: Manure only	Chemical only	Chemical and manure	Total using fertilizer	Total using mulch
St George's	22	5	5	10	20	21
St John's	14	5	-	9	14	14
St Mark's	4	2	1	1	4	3
St Patrick's	19	4	2	12	18	16
St Andrew's	38	4	3	21	28	30
St David's	21	4	3	12	19	14
Total	118	24	14	65	103	98
% of commercial farms	100	20	12	55	87	83

his contact with the extension service and the fact that farming practices improve as a farmer acquires more land and relies more heavily on agriculture for his livelihood.

Tools

These farmers are not quite as well equipped as the semi-commercial farmers; their index of occurrence of tools is .72, as compared to .74 (Table 9.14). The distribution of tools is similar, and the only noticeable difference is in the smaller proportion of farmers who possess forks. There is some variation between the parishes, as the index ranges from .67 in St George's and St John's, to .78 in St David's. While the low value in St John's is attributed to the poverty of the farmers in this parish (Table 9.7), the same index for St George's is due to few farmers possessing a cocoa knife, a tool not used in the

TABLE 9.14 COMMERCIAL FARMS: DISTRIBUTION OF TOOLS AND THEIR INDEX OF OCCURRENCE

Parish	Number of farms	Tools: Dutch hoe	Weeding hoe	Cutlass	Spade	Fork	Sack or basket	Cocoa knife	Index of occurrence
St George's	22	18	10	22	11	20	18	7	.67
St John's	14	7	2	14	11	13	10	9	.67
St Mark's	4	1	-	4	4	4	4	3	.71
St Patrick's	19	6	6	18	14	17	18	18	.71
St Andrew's	38	12	16	37	33	36	35	27	.73
St David's	21	15	14	20	14	17	20	14	.78
Total	118	59	48	116	91	107	105	78	.72
% of commercial farms	100	50	41	98	77	91	89	66	

cultivation of vegetables and sugar cane. The high index in St David's parish reflects the diversity of production, as well as the prosperity of these farmers who can afford these tools. As was noted with semi-commercial farmers, the Dutch hoe is preferred to the weeding hoe in St George's and St John's, and vice-versa in St Andrew's parish. In relation to the principal crops produced in the respective parishes this preference is paradoxical, although it may suggest that greater importance is attached to the preparation of vegetable beds, where the Dutch hoe is useful, than to the weeding of these beds, where the smaller weeding hoe is appropriate.

Labour

Commercial farmers work an average of 28 hours per week on their land, but there are differences, ranging from the purely supervisory role of an old farmer who has hired help, to a keen farmer in his forties who works 65 hours per week. However, the general pattern of work for a healthy farmer is of 6 to 7 hours per day, for 5 days per week. Differences between the parishes are slight. Some seasonal variations exist, as farmers who are artisans may practice their trade at times when their crops require little attention, such as after the harvest of the cocoa and nutmeg crops. This employment provides petty cash during the interval between the harvesting of their main crops. Farmers' wives often assist by helping in the kitchen garden for an hour or so each day, and by selling food crops in the market on Saturday.

Most commercial farms are neither large enough nor intensively operated to justify the presence of regular hired labour. However,

some of the older and more affluent farmers do hire labour on a part-time basis when arduous tasks are to be done, such as the cutting of bananas or the preparation of vegetable beds prior to the wet season. Both 'maroons' and 'day-for-day' work parties (supra, p. 216) and arranged by these farmers to assist them with their urgent, seasonal needs for labour.

Agricultural problems as identified by the farmer

By virtue of their involvement in agriculture, commercial farmers are more critical in their evaluation of the problems confronting their farming than either of the two previous groups. Although pests and disease remain the most common complaint, praedial larceny, inadequate roads and erosion are all problems which are more frequently recognised, and all directly related to the greater degree of fragmentation of commercial holdings (Table 9.15). The problem of obtaining hired labour is a very real one, as many of the older farmers can no longer work all their land by themselves. There is, however, a decrease in the proportion of farmers who mention difficulty in obtaining more land in proximity to their housespot as one of their problems. This reduction shows that commercial farmers are less concerned with expanding their farm unit than they are with maximizing the use of existing land, as is suggested by their concern over hired labour. Lack of capital in the form of farm loans, is cited as a problem by one-third of these farmers, mainly those who wish to hire labour and those who are ambitious and hope to improve or expand their farm.

TABLE 9.15 COMMERCIAL FARMS: AGRICULTURAL PROBLEMS AS IDENTIFIED BY THE FARMER

Parish	Number of farms	Types of problems: Difficulty in hiring labour	Poor market facilities	Poor roads	Lack of capital	Erosion	Pests and disease	Inability to acquire land close to home	Praedial larceny	Water supply
St George's	22	11	3	11	5	2	15	-	11	2
St John's	14	12	4	12	3	5	12	1	3	1
St Mark's	4	1	-	1	2	-	4	-	1	-
St Patrick's	19	11	1	11	8	8	17	1	8	3
St Andrew's	38	19	1	19	14	8	30	2	21	2
St David's	21	13	3	13	5	5	19	1	7	7
Total	118	67	12	67	37	28	97	5	51	15
% of commercial farms	100	57	10	57	32	26	82	5	43	13

Levels of farming

As commercial farms are essentially enlarged versions of semi-commercial farms with similarities in their character, the same criteria were adopted in defining levels of farming (supra, p.218). The result of this evaluation for commercial farms shows that 61 per cent are classified as 'average', with 19 per cent 'below' and 20 per cent 'above' (Table 9.16). These levels, however, differ from those of semi-commercial farms (Table 8.16), as there is a higher proportion in the 'average' class and a lower proportion in the 'above average' class. This result, therefore, indicates a small decline in the overall level of farming, over that on semi-commercial farms, but it is one which was predictable in light of the commercial farmer's lower social

TABLE 9.16 COMMERCIAL FARMS: EVALUATION OF LEVELS OF FARMING

Parish	No. of farms	Farming levels: Below average	Average	Above average
St George's	22	4	11	7
St John's	14	3	9	2
St Mark's	4	-	3	1
St Patrick's	19	3	13	3
St Andrew's	38	9	23	6
St David's	21	4	12	5
Total	118	23	71	24
% of commercial farms	100	19	61	20

and economic status and by the nature of his farming practice. There is little difference in the levels of farming between parishes. St George's, St Mark's and St David's, however, have more farms 'above average' than 'below', while the inverse occurs in St John's and St Andrew's. It is indicative of the homogeneity of this farm category that no clear-cut differences between the parishes are evident, as had hitherto been the case in the non- and semi-commercial categories.

Conclusion

Despite their lower average social and economic status, commercial farmers compare closely in their level of farming with the semi-commercial farmers discussed earlier. Their increased involvement and commitment to farming, their progressive attitude and interest in agriculture, and their motivation in becoming independent provide the compensating factors in this attainment. While in human terms this

achievement might represent personal success, it is not enough in terms of the general expectations from island agriculture that, despite their humbler background, they are farming at levels only just below those of semi-commercial farmers. Commercial farmers are not working their land as intensively, efficiently and scientifically as they could, and hence are not making the most of their opportunities. They constitute the major category of small farmers, and occupy considerably more land than semi-commercial farmers, yet one-fifth of their land is idle and they keep fewer livestock. This is not necessarily a criticism of these farmers as undoubtedly they have often worked hard at home and abroad in order to obtain their land, but it is an indictment of the system which makes it difficult for them to save, to buy property close to the home, and to become commercial farmers. It is therefore not until late in their working life that many of them achieve their goal. Thus, in their lifetime they may establish only 1 or 2 fragments of land in cocoa or nutmegs, because by the time it is desirable to replace these trees the farmers are no longer interested or fit to do so. The knowledge the ageing individual gains of the life cycle of these trees may rarely be transferred, with advantage, to further plantings on the same fragment. A previous background, possibly as a skilled worker, does not necessarily give to these individuals much experience in the cultivation of export crops. Too often their qualifications for efficient and knowledgeable farming are limited, and consequently, while they may enjoy the status of being independent, most of them do not realize their full potential as farmers. This unfortunate situation is, however, not so serious with operators of miniature estates, who are the subject of the following chapter.

CHAPTER 10

OPERATORS OF MINIATURE ESTATES

Introduction

Miniature estates are a larger, more developed and more efficient version of commercial farms. Although they are the smallest category, accounting for 12.3 per cent of the farms in the survey, miniature estates are the most influential and advanced of these farm categories. In terms of the acreage of land associated with these farms they are second in importance to the commercial farm category (396 acres as compared to 472 acres) and are therefore more significant than their proportion suggests.

These farms have developed in a number of ways, from commercial, semi-commercial or even non-commercial farms, while a few are the inherited fragments of former estates. By whatever means miniature estates are formed, there is a marked similarity in their crops, production and in the standard of farming practices. This is a reflection of the farmer's emulation of the estate system and his acceptance of progressive farming methods. Such achievement has been made through the economic motivation of these farmers to obtain a higher level of living. In this chapter, some of the social characteristics of these farmers which have contributed to this motivation are examined, and compared to those of farmers of the other types. This is followed by

a study of their farming system, which illustrates the superiority of its practices.

The spatial and proportional distribution of miniature estates

The distribution of the 36 miniature estates is less widespread than that of farms in the other categories, as half of them are located in St John's and St Mark's parishes, being concentrated mainly between the parish towns of Gouyave and Victoria (Fig. 13). This grouping results from the break-up of estates and the sale of fragments too large and expensive for poorer farmers to buy. The exact causes for this breaking-up of estates especially in these particular parishes are not clear, although major factors are thought to have been the lack of adequate roads, fluctuation in the market prices of export crops and the damage done by Hurricane Janet. Elsewhere, there is a smaller concentration of miniature estates in the south-east corner of St Patrick's parish, with the remainder scattered throughout the sample. The presence of only one such farm along the south coast is due to the escalation in the price of land as a result of the building of hotels and houses for retired people, such as those already established at Lance aux Epines and Westerhall Point.

In four parishes the miniature estate is the least important category within the parish sample, with less than 10 per cent. But in St John's and St Mark's parishes it is the most important category, accounting for 26.4 per cent and 38.1 per cent respectively (Table 7.1).

Social and economic characteristics

Previous, or present, occupations

Eight operators of miniature estates still have other employment, and of these 6 receive half, or less, of their total income from the sale of their agricultural produce. Those farmers with previous employment were of similar occupational groups and a tabulation of previous, and present, occupational groups of these farmers indicates this aspect of their social background (Table 10.1). Thus, the typical operator of a miniature estate has a background of manual work similar to that of the commercial farmer.

TABLE 10.1 OPERATORS OF MINIATURE ESTATES: OCCUPATIONAL GROUPINGS

Parish	Number of farmers	Occupational group: Estate worker	Unskilled labourer	Skilled labourer	Service industry	Civil service	No previous employment
St George's	3	1	-	1	-	-	1
St John's	10	2	1	5	1	-	1
St Mark's	8	3	-	1	1	-	3
St Patrick's	4	1	-	1	-	1	1
St Andrew's	8	3	-	3	1	-	1
St David's	3	1	-	2	-	-	-
Total	36	11	1	14	3	1	7
% of operators of miniature estates	100	31	3	36	8	3	19

Education

The average standard of educational attainment is 5.2, the highest of any farm category. All operators of miniature estates had reached the first standard and all but one had reached the third or higher. The mode of their attainment is the seventh standard, an indication that they had successfully completed their primary education. Variations between the parishes range from 3.6 in St George's to 7.6 in St David's (Table 10.2). Only in St George's and St Mark's do these farmers not have the highest educational attainment. The sample size is, however, too small for any strong inferences to be made.

TABLE 10.2 OPERATORS OF MINIATURE ESTATES: EDUCATIONAL ATTAINMENT

Parish	Number of farmers	Mean educational standard	Number of those not reaching 1st standard
St George's	3	3.6	-
St John's	10	5.5	-
St Mark's	8	4.3	-
St Patrick's	4	6.0	-
St Andrew's	8	4.8	-
St David's	3	7.6	-
Total	36	5.2	

All farmers had attained First Standard or above.

Experience abroad

Over half, 53 per cent, of these farmers have been employed overseas. This exceeds the corresponding proportion for commercial farmers and is therefore the highest for any group. Again, it is mainly skilled

labourers who went abroad, usually to Trinidad. A greater proportion than noted in previous categories went to the Dutch Islands and Venezuela (Table 10.3). All 5 of the skilled labourers in St John's parish worked abroad, while a few of the estate workers had had employment as overseers in Trinidad. Their stay abroad was usually longer than that of commercial farmers, they returned at a greater age, with more savings and possibly a gratuity. As a consequence they could afford to acquire miniature estates, as opposed to commercial farms.

TABLE 10.3 OPERATORS OF MINIATURE ESTATES: PLACE OF WORK ABROAD

		Place of work abroad						
Parish	Number of farmers	United Kingdom	North America	Aruba, Bonaire, Curacao	Trinidad	Latin America	Other West Indian islands	Total who worked abroad
St George's	3	1	-	-	1	1	-	2
St John's	10	1	-	2	3	2	1	7
St Mark's	8	-	1	1	-	-	-	2
St Patrick's	4	-	-	-	2	-	-	2
St Andrew's	8	-	-	2	1	-	-	3
St David's	3	-	-	-	1	2	-	3
Total	36	2	1	5	8	5	1	19
% of operators of miniature estates	100	6	3	14	22	14	3	53

Religion

Religious groups are also represented by those churches which are considered to possess greater motivation for material gain (Table 10.4). There is a continuation of a trend noted previously, for the

TABLE 10.4 OPERATORS OF MINIATURE ESTATES: CLASSIFICATION BY RELIGIOUS DENOMINATION

Parish	Number of farmers	Religious denomination								
		Roman Catholic	Anglican	Methodist	Presbyterian	Pentecostal	Baptist	Plymouth Brethren	Seventh Day Adventist	Jehovah Witness
St George's	3	-	2	-	-	1	-	-	-	-
St John's	10	5	2	-	2	1	-	-	-	-
St Mark's	8	3	1	-	-	-	1	-	2	1
St Patrick's	4	-	2	-	-	-	-	-	2	-
St Andrew's	8	2	2	3	-	-	-	-	1	-
St David's	3	1	1	-	-	-	-	1	-	-
Total	36	11	10	3	2	2	1	1	5	1
% of operators of miniature estates	100	30	27	8	6	6	3	3	14	3

proportion of Roman Catholics drops to 30 per cent, compared with the overall sample norm of 52 per cent. Adherents of Protestant churches dominate and it is only in St John's and St Mark's parishes that the Roman Catholic church emerges as a major denomination. Of the adherents of the other churches, the Anglican and Seventh Day Adventist are the most notable, with 27 per cent and 14 per cent respectively. This is evidence that religious attitudes influence both social achievement and the acquisition of material goods, including land. With succeeding categories of small farmers the Protestant element increases.

Race

There is a marked difference in the racial composition of these farmers compared to the other groups. The proportion of negroes, 42

per cent, is below the sample norm of 62 per cent and the lowest of any category, while that of coloureds, 33 per cent, and whites, 14 per cent, are above their norms (Table 10.5). This reinforces the hypothesis that the coloured and white racial groups are presently more highly motivated and more likely to achieve a position of higher status than is the negro. Those who are white, and about half those who are coloured, have either been managers of estates, or have inherited their land, as in the case of two white women who inherited part of their family's estate. The remaining half of the coloureds, together with the negroes and East Indians, are distributed in the remaining occupational groups. It has been noted that the East Indian has been represented among the occupiers of semi-commercial farms, commercial farms and miniature estates in approximately the same proportion

TABLE 10.5 OPERATORS OF MINIATURE ESTATES: CLASSIFICATION BY RACIAL GROUP

Parish	Number of farmers	Number in racial groups			
		Negro	Coloured	East Indian	White
St George's	3	1	2	-	-
St John's	10	5	2	2	1
St Mark's	8	2	3	1	2
St Patrick's	4	2	2	-	-
St Andrew's	8	3	3	1	1
St David's	3	2	-	-	1
Total	36	15	12	4	5
% of operators of miniature estates	100	42	33	11	14

as the sample norm. This representation, despite his having a generally low educational level, indicates an industrious attitude and a commercial acumen which has compensated for his poor schooling.

Household structure

Two outstanding characteristics of these households are the dominance of male heads, 94 per cent, and the stability of the marital status (Table 10.6). There are only two women operators of miniature estates, both descendants of former estate families. The high proportion of those who are married, 88 per cent, is indicative of higher social status than that of semi-commercial farmers (supra, p.190).

On average the operator of a miniature estate is older than farmers in other categories, being 55.3 years (although this age is not

TABLE 10.6 OPERATORS OF MINIATURE ESTATES: AGE, SEX, AND MARITAL STATUS

Parish	Number of farmers	Age in years	Sex		Marital status			
			Male	Female	Single	Married	Widowed	Separated
St George's	3	53.2	3	-	-	3	-	-
St John's	10	55.2	9	1	2	8	-	-
St Mark's	8	52.4	8	-	1	7	-	-
St Patrick's	4	55.8	4	-	-	4	-	-
St Andrew's	8	52.2	7	1	-	7	1	-
St David's	3	66.3	3	-	-	3	-	-
Total	36	55.28	34	2	3	32	1	-
% of operators of miniature estates	100		94	6	9	88	3	-

statistically different from the commercial farmers, it is statistically different from both the non-commercial and semi-commercial farmers). The age structure shows that 53 per cent are between 45 and 64 years, 25 per cent over 65 and 19 per cent between 40 and 44. Only one operator is under 40 years of age. This age structure is similar to that for commercial farmers and illustrates the late stage in life at which economic independence in farming is reached.

Among the parishes, only in St David's, where the average age of these farmers is 66.3 years, is there any appreciable difference from the mean.

Levels of living

The index of the level of living supports the claim that these farmers are of higher social status and have a higher degree of economic motivation than those in previous categories. Their index is .56 as compared to the next highest, .33, which is associated with the semi-commercial farmer. In less abstract terms this means that twice as many households have electricity, sewerage, a refrigerator and a motor vehicle (Table 10.7). This is not a level which could be forecast from their previous occupational background, which is not distinctly different from that of commercial farmers. Examination of differences in these indices among the parishes, which vary from .38 in St Patrick's to .87 in St David's, does not clarify the situation, as these levels cannot be related to any single aspect of background, e.g. education or occupation. It is the result of a complex of social factors, which includes personal ambitions and attitudes, that have made these persons into operators of miniature estates.

TABLE 10.7 OPERATORS OF MINIATURE ESTATES: LEVELS OF LIVING AS INDICATED BY POSSESSION OF CONVENIENCES AND GOODS

Parish	Number of farms	Conveniences and goods								Index of occurrence
		Electricity	Sewerage	Plumbing	Gas stove	Refrigerator	Radio	Telephone	Motor vehicle	
St George's	3	3	1	2	3	2	3	-	1	.62
St John's	10	7	4	6	4	5	9	1	5	.51
St Mark's	8	3	3	4	6	3	7	1	7	.53
St Patrick's	4	1	1	2	3	1	3	-	1	.38
St Andrew's	8	2	6	6	5	5	8	1	2	.55
St David's	3	3	2	3	3	3	3	1	3	.87
Total	36	19	16	23	24	19	33	4	23	.57
% of operators of miniature estates		53	45	64	67	53	92	11	64	

Summary

The feature which distinguishes the miniature estate from the other farm categories is the higher level of living their households enjoy. Social factors contribute to this achievement, as the operator of the miniature estate has the highest level of educational attainment and more experience of working abroad, an experience which has provided him with the capital by which he established himself as a small farmer. In addition he is more likely to be non-negro, and a member of a Protestant church, than the negro and Catholic stereotype of previous categories. His marital status is more secure, and his age in the mid-fifties. These factors make him the most stable, motivated, and progressive of the categories of small farmers. He is no longer

bound by traditional concepts and attitudes, possessing an outlook which accepts innovations without suspicion or scepticism. This outlook is reflected in his agricultural enterprise.

The agricultural unit

Miniature estates generally represent the best worked and attended land in the survey. Export crops are the main speciality and, irrespective of the fragment on which they are found, the trees are adequately spaced and pruned, the drainage ditches are well maintained, and fertilizer is applied in the approved manner. Disease and pests are not completely checked, but the incidence of Blackpod and Witches' Broom disease in cocoa and of Nematodes[1] in bananas is less than that on semi-commercial and commercial farms. Cropping patterns and areas of cultivation of export crops are the same as for these latter farm categories.

Food crop cultivation is less important on miniature estates than it is in previous farm categories, and the methods by which vegetables are cultivated vary from well-prepared beds to haphazard propagation. The few farmers who are vegetable gardeners demonstrate a skill and knowledge in their cultivation methods which rivals that of the most progressive small farmers. Hence interplanting of crops is rare, and occurs only in the cane fields where yams or tannias are planted on

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1. Blackpod (Phytophthors balmivora), a fungus infection of cocoa pods which prevents the pods from maturing.
   Witches' Broom, a disease which decreases the yields and causes the death of cocoa trees.
   Nematodes (Radapholus similis), a worm which attacks the fleshy roots and sucker head of the banana plant.

ridges between the young canes. Most other vegetables are planted in orderly rows in well-prepared beds. Some crops are subjected to a series of transplants from seed box to nursery bed, and possibly to a larger bed. These beds are well-forked, weeded and composted. The regular incorporation of a three- or four-fold system of crop rotation in their planting is further evidence that these farmers are more knowledgeable and experienced than those in the other categories.

Characteristics of the land

Miniature estates have an average size of 11.09 acres or more than twice the size of commercial farms. Parish acreages vary from 9.67 acres in St George's to 12.66 acres in St Mark's (Table 10.8), a difference which reflects the nature of land use, whereby market

TABLE 10.8 MINIATURE ESTATES: CHARACTERISTICS OF THE FARMS

	Characteristics				
Parish	Number of farms	Mean number of fragments	Mean size of farm (acres)	Mean size of cultivated land (acres)	% cultivated land of total land
St George's	3	5.33	9.67	9.25	96
St John's	10	2.30	11.08	9.48	86
St Mark's	8	2.86	12.66	10.41	82
St Patrick's	4	4.50	10.25	9.13	89
St Andrew's	8	2.13	10.41	9.63	93
St David's	3	4.00	11.30	8.8	78
Total	36	3.00	11.09	9.61	86.7

gardeners have smaller farms as in St George's, and the availability of land as in St Mark's. Of all the farm categories this has the highest proportion of total farm land in cultivation, 9.61 acres, or 86.7 per cent. This amount varies from 78 per cent in St David's parish, where the farmers are oldest, to 96 per cent in St George's parish, where the farming is the most intensive. As land in St Mark's parish is still in the process of being developed, only 82 per cent of its farms are in cultivation (Table 10.8).

As with the pattern of previous categories, increase in farm size is accompanied by an increase in fragmentation. However, this increase is not a proportional one, as each farm has an average of 3.00 fragments, only .29 fragments larger than that for commercial farms where the farm size is less than half, 4.08 acres. Thus, the average size of the fragments comprising the miniature estate is 3.70 acres, as compared to 1.49 acres on commercial farms, and 1.26 acres on semi-commercial farms. This allows the operator of a miniature estate to realize the economic advantages of larger fragments, especially those advantages related to transport of fertilizers and produce.

There is a difference between the parishes in the degree of fragmentation which is related to the growth of the farms and to the availability of land. Farms belonging to former estate overseers or skilled labourers who had not worked overseas frequently had 4 or 5 fragments which were accumulated gradually, possibly as the farm passed through the semi-commercial or commercial categories. Farmers who had worked overseas have less fragmented farms, often with only 1 or 2 parcels of land, as their savings allowed them to purchase a 5 to 10

acre fragment to complement another fragment which might possibly have been inherited. This explains the small degree of fragmentation in St John's parish (2.35 fragments per holding) where 7 out of 8 farmers had worked abroad, and where it has been possible to purchase fragments of this size through the sub-division of estates.

Of these farms, all except 5 have a single fragment, 25 farms, or 69 per cent, contain two fragments, 3, four fragments, and the remaining 6 farms, 17 per cent, contain more than five fragments. The extent of this fragmentation only serves to divide the farmer's effort and attention, and impede his efficiency.

As has been noted previously, the increase in farm size and degree of fragmentation are accompanied by an increase in the proportion of fragments held in freehold title. Thus, on miniature estates 84 per cent of the fragments are owned, 8 per cent rented, 6 per cent held in usufruct and 2 per cent share-cropped (Table 7.8). This is the highest proportion of owned land and the lowest proportion of rented land in any category. It indicates security of tenure and the impracticability of renting land where leases are commonly of short duration, and crops, such as cocoa and nutmegs, a long term investment. Share-cropped land is found only on the one miniature estate in the cane belt of St George's parish.

Land use

Vegetable crops

An unexpected feature of the miniature estates is the general lack of vegetable gardening (Table 10.9). Both the kitchen garden and

TABLE 10.9 MINIATURE ESTATES: VEGETABLE CROP OCCURRENCE

Parish	Fragment number	Number of fragments	Tropical roots & tubers							Temperate roots				Green leaf		
					Ground provisions											
			Arrowroot	Cassava	Dasheen	Eddoes	Sweet potatoes	Tannias	Yams	Beetroot	Carrots	Onions	Radishes	Cabbages	Celery	Lettuce
St George's	1	3	-	1	1	1	-	1	-	-	-	1	-	1	1	3
	2	3	-	1	1	1	2	2	2	-	-	-	-	-	-	1
	3	3	-	2	-	1	1	-	3	1	-	-	-	1	-	1
	4	2	-	-	-	1	2	-	1	1	-	-	-	1	-	-
	5	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-
	6	1	-	-	-	-	-	1	1	-	-	-	-	-	-	-
	7	1	-	-	-	-	1	-	-	1	1	1	-	-	1	-
St John's	1	10	-	1	5	1	2	4	5	-	1	-	-	1	-	1
	2	8	-	-	3	-	2	3	2	-	-	-	-	2	-	-
	3	2	-	-	-	-	-	-	1	-	-	-	-	1	-	-
	4	2	-	-	1	-	-	1	1	-	-	-	-	-	-	-
	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St Mark's	1	8	-	1	2	-	1	2	2	-	-	-	-	1	-	1
	2	8	-	2	-	1	1	2	4	-	-	-	-	1	-	-
	3	3	-	-	-	-	-	2	2	-	-	-	-	-	-	-
	4	2	-	-	-	-	-	-	2	-	-	-	-	-	-	-
St Patrick's	1	4	-	1	4	-	-	4	4	-	1	-	-	1	-	3
	2	4	-	1	2	-	1	2	2	-	-	-	-	-	1	-
	3	3	-	1	1	-	-	2	-	-	-	-	-	-	-	-
	4	3	-	1	-	-	-	1	1	-	-	-	-	-	-	-
	5	2	-	1	-	1	-	1	2	-	-	-	-	-	-	-
St Andrew's	1	8	-	-	4	-	1	1	2	-	-	-	-	1	-	-
	2	5	-	1	-	-	1	2	3	-	-	-	-	-	-	-
	3	4	-	-	-	-	-	1	-	-	-	-	-	1	-	1
	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St David's	1	3	-	-	2	-	-	1	1	-	-	-	-	-	-	-
	2	3	-	-	-	-	-	-	1	-	-	-	-	-	-	-
	3	2	-	-	-	-	-	1	1	-	-	-	-	-	-	-
	4	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-
	5	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Total	1	36	-	4	18	2	3	13	14	-	2	1	-	5	1	11
	2	31	-	5	6	2	6	11	14	-	-	-	-	3	1	2
	3	17	-	3	1	1	1	5	7	1	-	-	-	3	-	2
	4	12	-	1	1	1	2	2	6	1	-	-	-	1	-	-
	5	6	-	1	-	1	1	1	3	-	-	-	-	-	-	-
	6	1	-	-	-	-	-	1	1	-	-	-	-	-	-	-
	7	1	-	-	-	-	1	-	-	1	1	1	1	-	1	-

TABLE 10.9

Parish	Fruit and pod											Others		Index of occurrence	Number of different crops
	Corn	Cow peas	Cucumbers	French beans	Groundnuts	Melogene	Okra	Peppers	Pigeon peas	Pumpkins and melons	Tomatoes	Seasoning	Sugar cane		
St George's	2	1	-	-	1	2	3	1	2	-	3	1	-	.32	17
	1	-	1	-	-	-	1	1	1	-	1	-	1	.21	14
	1	-	1	1	-	-	-	-	2	-	1	1	2	.23	14
	-	-	-	-	-	1	1	-	-	-	1	1	1	.22	10
	2	-	-	-	-	-	-	-	1	-	-	-	2	.14	4
	-	-	-	-	-	-	-	-	-	-	-	-	1	.11	3
	1	1	1	1	-	1	1	1	1	-	1	-	-	.52	14
St John's	1	-	-	1	-	1	3	1	2	-	2	3	-	.14	17
	2	-	-	1	-	-	2	2	3	1	2	-	-	.12	12
	1	-	-	1	-	-	1	-	1	-	1	-	-	.14	7
	-	-	-	-	-	-	-	-	-	-	-	-	-	.06	3
	-	-	-	-	-	-	-	-	-	-	-	-	-	.00	-
St Mark's	-	-	1	1	-	-	-	-	2	-	-	1	-	.06	11
	1	-	1	1	-	1	-	-	1	-	2	1	1	.09	14
	-	-	-	-	-	-	-	-	1	-	-	-	-	.05	3
	1	-	-	-	-	-	-	-	1	-	-	-	-	.09	3
St Patrick's	4	-	2	4	-	3	3	2	4	-	2	1	1	.41	18
	3	-	1	1	-	1	3	1	4	-	1	-	2	.24	14
	-	-	-	-	-	-	-	-	-	-	-	-	-	.06	4
	-	-	-	-	-	-	-	-	1	-	-	-	-	.05	4
	1	-	-	-	-	-	-	-	1	-	-	-	-	.13	6
St Andrew's	2	1	1	2	-	1	1	4	4	-	1	1	-	.12	15
	-	-	1	1	-	-	1	-	1	-	1	-	-	.09	9
	-	1	1	-	-	1	-	-	1	-	1	-	-	.08	8
	-	-	-	-	-	-	-	-	-	-	-	-	-	.00	
St David's	-	-	-	-	-	-	-	-	1	-	-	-	1	.07	5
	-	-	-	-	-	-	-	-	-	-	-	-	-	.01	1
	-	-	-	-	-	-	-	-	-	-	-	-	-	.04	2
	-	-	-	-	-	-	-	-	1	-	1	-	-	.09	3
	-	-	-	-	-	-	-	-	-	-	-	-	-	.07	1
Total	9	2	5	7	1	7	10	8	15	-	8	7	2	.16	24
	7	-	3	3	-	2	7	4	10	1	7	1	4	.11	20
	2	1	2	3	-	1	1	-	6	-	3	1	2	.10	20
	1	1	-	-	-	1	1	-	3	-	2	1	1	.08	17
	3	1	-	-	-	-	-	-	2	-	-	-	3	.10	10
	-	-	-	-	-	-	-	-	-	-	-	-	1	.11	3
	1	1	-	1	-	1	1	1	1	-	1	-	-	.52	14

provision grounds have less development than that noted in the previous categories. The prevalent attitude among most operators of miniature estates is that vegetables are more trouble than they are worth, and that their time and money are better spent concentrating on export crops. Some of them thought that vegetables could be purchased in the market at lower prices than those at which they could be produced. This economic explanation is not wholly plausible, and it is thought that many of these farmers consider the back-breaking cultivation of vegetables unfitting for persons of their social standing. In any case their paradigm, the estate establishment, does not have a kitchen garden around the estate house, and provision grounds are associated only with estate workers. Consequently, the index of vegetable occurrence for the kitchen garden is .16, the lowest of any category. Only dasheen is found in more than half these gardens, while pigeon peas, tannias and yams are present on more than one-third. On over half these farms, the vegetable plot has given way to grass and flowers. Only in St George's and St Patrick's parishes does the kitchen garden have a comparable level of development to that on other types of farms (indices are .38 and .41 respectively). Both St Mark's and St David's parishes have few vegetables, as shown by indices of .06 and .07 respectively. While St Mark's has not been noted for its kitchen gardens, their poor development in St David's is attributed partly to the greater age of its farmers and partly to preference for flower gardens around their homes.

Subsequent fragments have a corresponding lack of vegetables in their provision grounds; their indices range from .08 to .11, except for F7 which is .52 and belongs to a vegetable gardener. The principal

crops on these fragments are pigeon peas, corn, tannias and sweet potatoes (Table 10.9).

Only in St George's parish are there well-developed provision grounds on F2, F3 and F4, where the index of occurrence exceeds .20. This difference is attributable to an emphasis on vegetable crops, and is discussed later in this chapter. The variety of crops grown on F7 is an indicator of specialization, and of a farmer's choice of land to produce certain vegetables. Although this fragment is 2.5 miles from his home, it has the Plains Sandy Loam soil with an A/B slope and is ideally suited to the year-round cultivation of temperate root crops, leaf and salad vegetables, under a system of irrigation. It is the ever-present demand for these crops in St George's Town and by neighbouring hoteliers that encouraged this enterprising farmer to specialize in this way. Vegetable gardening is not widely practised in the other parishes, neither to satisfy the requirements of the household nor for commercial sale.

Tree crops

The index of occurrence of tree crops is high, the value of .55 on F1 being as high as that in the other categories (Table 10.10). For the first three fragments, the index does not differ appreciably, although it declines on the remaining fragments. There is a difference in the types of trees which are dominant on F1 in comparison to those of the other types of farms. Whereas food trees, such as coconut, bananas, breadfruit and mango, are the main types on other categories, on miniature estates export crops rival these food trees in occurrence. Bananas are present on 83 per cent of these fragments, cocoa on 81 per cent,

TABLE 10.10 MINIATURE ESTATES: TREE CROP OCCURRENCE

Parish	Fragment no.	No. of fragments	Avocado pear	Bananas	Breadfruit	Cocoa	Coconut	Lime	Other citrus	Mango	Nutmegs	Sapodilla	Other fruits	Index of occurrence
St George's	1	3	3	1	3	3	3	2	3	3	-	-	-	.70
	2	3	2	2	1	-	3	1	2	3	-	-	-	.42
	3	3	2	2	1	1	3	-	1	3	-	-	1	.42
	4	2	1	-	-	-	1	1	-	-	-	-	-	.14
	5	2	2	-	-	-	2	-	1	2	-	-	1	.36
	6	1	-	1	-	-	-	-	-	-	-	-	1	.18
	7	1	-	-	-	-	1	1	-	1	-	-	-	.27
St John's	1	10	6	10	6	8	5	5	7	7	7	2	3	.60
	2	8	3	6	6	6	4	1	6	7	7	1	3	.50
	3	2	-	1	2	9	7	1	1	-	2	-	-	.50
	4	2	-	1	1	-	-	-	-	-	1	-	-	.14
	5	1	-	1	-	1	1	1	1	1	-	-	-	.54
St Mark's	1	8	3	6	5	6	7	2	3	5	6	-	1	.52
	2	8	5	8	5	8	6	1	4	6	7	1	1	.59
	3	3	2	3	2	3	2	-	2	2	3	-	1	.67
	4	2	1	1	1	1	1	-	-	1	2	1	1	.45
St Patrick's	1	4	3	3	2	3	4	2	2	3	2	3	3	.68
	2	4	2	4	3	4	3	1	2	3	3	1	2	.63
	3	3	2	3	3	3	2	1	2	2	2	1	1	.67
	4	3	-	3	1	1	1	1	-	2	2	1	-	.33
	5	2	-	2	1	1	-	-	-	2	1	-	1	.18
St Andrew's	1	8	4	8	6	6	3	3	4	3	5	-	-	.48
	2	5	1	4	2	4	2	-	2	3	5	2	-	.45
	3	4	2	4	-	2	4	1	2	2	3	1	-	.47
	4	1	-	1	1	1	1	-	-	-	1	-	-	-54
St David's	1	3	2	2	3	3	3	-	1	2	3	1	-	.62
	2	3	1	1	3	3	3	-	2	1	3	-	-	.51
	3	2	1	2	2	2	1	-	2	2	2	-	-	.68
	4	2	1	-	-	2	1	-	1	2	1	2	1	.54
	5	1	-	-	1	1	1	-	-	-	1	-	-	.36
Total	1	36	18	30	22	29	25	14	20	23	23	4	9	.55
	2	31	12	25	20	25	27	5	18	23	25	5	6	.54
	3	17	9	14	10	13	14	3	10	11	12	2	4	.54
	4	12	2	5	4	5	5	2	1	5	7	4	1	.31
	5	6	2	2	2	2	4	-	2	3	2	-	2	.32
	6	1	-	1	-	-	-	-	-	-	-	-	1	.18
	7	1	-	-	-	-	1	1	-	1	-	-	-	.27

coconut on 70 per cent, and both nutmegs and mangoes on 63 per cent. On previous types of farms it was on the second, third or fourth fragments that cocoa and nutmegs became the dominant crops. This is a further indication of concentration on export crops by the operators of miniature estates. As was the case for vegetable crops, St George's and St Patrick's parishes have the highest indices of tree crops on F1, .70 and .68 respectively. That farms in St Patrick's parish show this development of kitchen gardens reflects their lower level of living, because as few own motor vehicles the purchase of food crops in the major market towns of St George's and Grenville is made more inconvenient and expensive. Conseqently their kitchen gardens are more necessary than in the parishes.

On F2 and F3, export crops are dominant and have a similar frequency of occurrence (Table 10.10). The nutmeg becomes the most common tree on F4 and indicates the general tendency for higher numbered fragments to be at higher elevations. Fragment 5 has no specific crop emphasis, although a major export crop is present on all but one of these fragments. This does not imply these fragments are not intensively used, as they are notable for cultivation in pure stands, so that once an export crop has been established it is interrupted only by wind breaks or fruit trees which provide shade and/or are property line markers.

Cash crops

As can be inferred from the high indices noted for tree crops and low indices of vegetables, miniature estates are almost exclusively producers of bananas, cocoa and nutmegs. On the basis of the principal cash crop, 91 per cent of these farmers sell export crops;

the others sell either leaf and salad vegetables or sugar cane (Table 10.11). Cocoa, representing the major sources of crop income on 56 per cent of these farms, is clearly the most important crop, and is followed by bananas and nutmegs. This is in part a reflection upon the concentration of miniature estates in St John's and St Mark's parishes, as 16 operators out of the 18 who name cocoa as their major crop are in these parishes. In St Patrick's, St Andrew's and St David's parishes either nutmegs or bananas are financially more important than cocoa. St George's parish demonstrates its uniqueness, as its farmers specialize in vegetables and cane, none has an export crop as a principal cash crop.

With respect to the other cash crops, the triumvirate of bananas, cocoa and nutmegs predominates and accounts for 82 per cent of the second named crop, and 74 per cent of the third. Two-thirds of the miniature estates sell all 3 export crops as their major ones, while a further 14 per cent sell 2 of the 3. Operators who name cocoa as their principal crop usually have bananas as their second, while those with either bananas or nutmegs as their first, have cocoa as their second. On a few farms coconut and citrus fruit are supplementary cash crops.

Of the 2 farmers in St George's parish who specialize in vegetables, one sells cocoa and the other bananas as his ancillary crop. The cane farmer has ground provisions (yams and sweet potatoes) as his second cash crop, and coconuts (copra) as his third. Vegetable crops do not become a more common second or third cash crop as they do on semi-commercial and commercial farms.

These 3 cash crops do not represent the total sale from the

TABLE 10.11 MINIATURE ESTATES: PRINCIPAL CASH CROPS

Parish	Export crops						Ground provisions	Leaf and salad veg.	No sale
	Bananas	Cocoa	Nutmegs	Limes	Coconut	Cane			
	Principal cash crop								
St George's	-	-	-	-	-	1	-	2	-
St John's	1	9	-	-	-	-	-	-	-
St Mark's	1	7	-	-	-	-	-	-	-
St Patrick's	2	1	1	-	-	-	-	-	-
St Andrew's	3	2	3	-	-	-	-	-	-
St David's	-	1	2	-	-	-	-	-	-
Total	7	20	6	-	-	1	-	2	-
% of total	19	56	16	-	-	3	-	6	-
	Second cash crop								
St George's	-	1	-	-	-	-	2	-	-
St John's	5	1	3	1	-	-	-	-	-
St Mark's	2	2	4	-	-	-	-	-	-
St Patrick's	2	2	-	-	-	-	-	-	-
St Andrew's	1	5	1	-	1	-	-	-	-
St David's	1	-	-	-	1	-	-	-	1
Total	11	11	8	1	2	-	2	-	1
% of total	30	30	24	3	6	-	6	-	3
	Third cash crop								
St George's	1	-	-	-	1	-	-	1	-
St John's	1	1	3	1	-	-	-	1	3
St Mark's	4	-	3	-	-	-	-	-	1
St Patrick's	2	1	1	-	-	-	-	-	-
St Andrew's	2	1	4	-	-	-	-	-	1
St David's	2	-	1	-	-	-	-	-	-
Total	12	3	12	1	1	-	-	2	5
% of total	33	8	33	3	3	-	-	6	14

miniature estates, though they do represent over 90 per cent of the agricultural income. Other crops which are sold include fruit, such as breadfruit, mangoes, avocado pears, and ground provisions, although these crops are often given away to friends and relatives.

Social aspects of crop specialization

Racial preference for the cultivation of certain crops has been noted amongst the semi-commercial and commercial farmers. It is a less distinguishable feature among the operators of miniature estates, owing to the emphasis on export crops. East Indians all name cocoa as their principal cash crop. Both producers of vegetables are coloured, and the cane farmers are negro.

Another social aspect which influences the particular crop emphasis of a miniature estate, is the age of the respondent. Farmers under 45 years of age have a tendency to cultivate bananas as their principal crop, while those over 64 years are more likely to have cocoa or nutmegs. This, however, is not as strongly evident among these farmers as it is in the previous two categories of farms, because they can afford to hire labour to do those jobs which they are no longer physically able to perform themselves.

Other social factors, such as education, religion, sex and experience overseas, do not show any clear relationship with the crop grown.

Livestock

Livestock are a more common feature on miniature estates than they are on any other type of small farm (Table 10.12). A comparison

TABLE 10.12 MINIATURE ESTATES: NUMBER AND DISTRIBUTION OF LIVESTOCK

Parish	No. of farms	Fowls/household	Dairy cattle	Beef cattle	Milch goats	Meat goats	Pigs	Sheep	Draught donkeys	Manure donkeys
			Number of livestock							
St George's	3	22.0	6	3	-	5	4	7	2	1
St John's	10	6.8	4	-	6	2	12	1	2	2
St Mark's	8	8.8	3	1	1	2	3	6	5	3
St Patrick's	4	4.5	1	2	2	-	-	-	3	1
St Andrew's	8	12.1	3	1	3	3	8	2	1	1
St David's	3	21.3	-	-	-	-	1	-	1	-
Total	36	16.7	17	7	12	12	28	16	14	8
Ratio/farm			.47	.19	.33	.33	.78	.45	.39	.22
			Number of farms with livestock							
St George's			3	1	-	1	2	2	1	1
St John's			3	-	3	1	5	1	2	2
St Mark's			2	1	1	2	3	1	4	2
St Patrick's			1	2	2	-	-	-	3	1
St Andrew's			3	1	2	3	5	1	1	1
St David's			-	-	-	-	1	-	1	-
Total			12	5	8	7	16	5	12	7
Percentage of miniature estates			33	14	22	19	45	14	33	19

of the ratios of head of livestock per household, shows that the miniature estate has the highest number for fowls, dairy cattle, milch and meat goats, and draught and manure donkeys. The emphasis on milk-producing livestock is an indication of the value these farmers attach to fresh dairy produce. This is another example of their higher social and economic status. Despite the number of motor vehicles and the use of artificial fertilizers, donkeys are still kept in appreciable numbers, as the service of these animals is particularly important since the lack of all-weather roads, degree of fragmentation, and the size and terrain of some of these fragments, give rise to difficulties of transportation.

St George's parish is outstanding for both the number and variety of livestock, giving to the farms here a character of mixed farming. In contrast, few livestock except fowls are kept in St David's parish, where the older farmers find animals difficult to manage.

No distinct social differences are apparent amongst farmers who keep livestock.

Other farm characteristics

Sources of farming knowledge

Operators of miniature estates acquire their farming knowledge from more formal sources than the farmers in other categories. This is mainly due to their contact with the extension service, from which 91 per cent benefited. Those not receiving this assistance did so out of choice rather than from ignorance of the service. The advice given by extension instructors deals with the use and application of

fertilizer, the cultivation of quality trees and vegetables, methods of erosion control, irrigation, new and improved techniques of cultivation, the control of pests and disease, and maintenance of livestock. The agricultural importance of the miniature estate, and the local recognition that its owner is a leading farmer in the community, contributes to his receiving this service from the Agricultural Department. It has undoubtedly helped such farmers to attain a prosperous and efficient farm unit. Additionally, the level of education enables these farmers to benefit from farm books the instructor may recommend, or pamphlets he may hand out, thus increasing the formal sources of their knowledge.

Traditional sources of farming knowledge are acknowledged, but to a lesser extent than by the farmers of smaller holdings. Only 45 per cent credited their parents and guardians with teaching them anything about farming (compared to over 70 per cent in some of the other categories). This indicates that traditional practices and values are less widely followed, and this is especially so for those who had worked in the Dutch Islands, Venezuela or Great Britain, or who are strongly influenced by their extension instructor. Friends and neighbours are even less important as a source of farming knowledge, only 16 per cent mentioning them.

Experience from working on an estate benefited 22 per cent of these farmers, of which more than half are in St Andrew's, a parish previously noted for its estate employment. For the first time in any category, farmers recognise their own experience in agriculture (outside the estate) as benefiting their farming. This is indicative of their intelligence, their interest in agriculture, and a lifetime of working the

land, as the 41 per cent who learned from their own experience are not those who had worked abroad. Such farmers are often the most knowledgeable and farm in a confident and efficient way.

Despite these sources of knowledge, MacDonald's Almanac is still followed as a guide to the planting, pruning and fertilizing of crops in conjunction with the phase of the moon. However, its popularity is less than with semi-commercial and commercial farmers, as 67 per cent alluded to it.

Farming practices

Farming practices reach their highest levels on miniature estates, as is indicated by the widespread use of fertilizer and mulching (Table 10.13). All farmers use chemical fertilizer, although 78 per cent of

TABLE 10.13 MINIATURE ESTATES: USE OF FERTILIZER AND PRACTICE OF MULCHING

Parish	Number of farms	Type of fertilizer: Chemical only	Type of fertilizer: Chemical and manure	Total using mulch
St George's	3	-	3	3
St John's	10	1	9	8
St Mark's	8	2	6	7
St Patrick's	4	2	2	4
St Andrew's	8	3	5	7
St David's	3	-	3	3
Total	36	8	28	32
% of miniature estates	100	22	78	89

them also put manure on their land. The use of manure is limited, especially since these farms are not noted for their food crop production, in which sphere the use of manure is most widespread. Outside the kitchen garden it is used in the planting of cocoa and nutmeg seedlings, and on young banana plants. It is preferred to chemical fertilizer during the early stages of the establishment of these crops, as it doubles as a mulch, and does not burn the tender roots of these plants. Those who do not use manure, do not own livestock of a suitable type or have their land established in tree crops and so do not require it. Chemical fertilizers are selected so that the most beneficial general purpose fertilizer is applied to a given crop on a given soil, so one farmer may use several different types. A few farms had their soils tested by the Department of Agriculture for the purpose of determining the most suitable type of fertilizer.

Mulching of crops is undertaken on 89 per cent of these farms and is therefore more widely practised than in the other farm categories. Thus miniature estates continue to show their supremacy over the other categories.

Tools

It is predictable from the foregoing that the miniature estates are the best equipped. This is indicated by their index of occurrence of tools, .80, as compared to the next highest, .72, for semi-commercial farmers. The most notable difference in tools is the greater proportion of farmers owning a spade and a cocoa knife. Hoes are the least common tools; the weeding type is present on 33 per cent of these farms and the Dutch type on 53 per cent (Table 10.14). The absence of hoes

TABLE 10.14 MINIATURE ESTATES: DISTRIBUTION OF TOOLS AND THEIR INDEX OF OCCURRENCE

Parish	Number of farms	Tools: Dutch hoe	Weeding hoe	Cutlass	Spade	Fork	Sack or basket	Cocoa knife	Index of occurrence
St George's	3	3	3	3	3	3	3	2	.95
St John's	10	8	2	10	9	9	10	10	.83
St Mark's	8	3	1	8	8	7	7	6	.71
St Patrick's	4	-	4	4	4	4	4	4	.85
St Andrew's	8	2	1	8	7	8	8	6	.72
St David's	3	3	1	3	3	3	3	2	.85
Total	36	19	12	36	34	35	35	30	.80
% of miniature estates	100	53	33	100	94	97	97	83	

reflects the crop specialities of these farms. Only in St George's and St Patrick's parishes, where kitchen gardens are best developed, is the weeding hoe found on all farms.

St George's parish has the highest index of occurrence of tools, .95, while St Mark's and St Andrew's have the lowest indices, .71 and .72 respectively, owing to a lack of hoes.

In addition to this equipment, 5 holdings have portable sprayers for controlling disease and insects, and 3 have irrigation equipment, including pumps, pipes and sprinklers. As about half the motor vehicles these farmers own are Land Rovers, they are well equipped for working and managing their land.

Labour and management

The operators of miniature estates either supervise work on their

land in the manner of estate managers, or are actively engaged in working it themselves. The average time occupied with their land is 26 hours per week, a figure similar to that of the commercial farmer. The actual time spent on the land, however, varies from armchair supervision, in the case of one woman owner and an old blind man, to 66 hours per week, by a food crop farmer. Farmers who are physically fit and in their fifties commonly work 35 to 45 hours per week of they hold no other position of employment. On all these farms regular assistance is found, usually in the form of a regular hired hand although occasionally a diligent wife or grown-up son provides help. During the cocoa and nutmeg harvest further assistance might be employed. In the cane planting season, the one cane farmer organizes a 'maroon' to assist him with labour problems. Such labour arrangements are not regularly employed on the other farms, as they are thought to be unbecoming of farms which have pretensions of estate organization.

Farming problems as identified by the farmer

The increase in farm size and fragmentation has in previous categories influenced the nature of agricultural difficulties identified by the farmer (Table 10.15). Operators of miniature estates are no different, except that their perception of the problems is more acute. The most common complaint, as it has been in all categories, is that of pests and diseases damaging crops or killing livestock; this affects 80 per cent of these farmers. Loss of produce by praedial larceny is a less common complaint, and is mentioned by 23 per cent. Reasons for this are a concentration upon export crops, which are less susceptible to thieving, the regular and unexpected visits the operator makes to his

fragments, and the philosophical attitude taken by these operators to the loss of some produce; it is a sign of their magnanimity that they do not appear concerned or to complain about incidents of petty thieving.

While problems such as lack of capital and erosion are as common as they are on commercial farms, inadequate transport and market facilities are more frequently mentioned. Three-quarters of these farmers mention the lack of an adequate road network as discouraging certain aspects of their farming, and this is especially so in the cultivation of bananas, which require weekly trucking to St George's Town in an unbruised condition to avoid rejection for shipment. Poor marketing facilities are a complaint of 25 per cent of these farmers, especially among those who have difficulty in transporting their produce to the cooperative depot. This is a consequence of the increased scale of

TABLE 10.15 MINIATURE ESTATES: AGRICULTURAL PROBLEMS AS IDENTIFIED BY THE FARMER

Parish	Number of farms	Types of problems: Difficulty in hiring labour	Poor market facilities	Poor roads	Lack of capital	Erosion	Pests and disease	Praedial larceny
St George's	3	1	2	2	1	1	2	1
St John's	10	4	3	7	2	3	7	2
St Mark's	8	3	1	7	4	2	6	-
St Patrick's	4	2	1	3	2	1	4	2
St Andrew's	8	4	2	5	2	3	7	3
St David's	3	1	-	3	-	-	3	2
Total	36	15	9	27	11	10	29	10
% of miniature estates	100	41	25	75	31	28	80	28

production, whereby it is no longer convenient to take a sack of cocoa beans or nutmegs to the depot at irregular intervals.

The obtaining of hired labour is still thought of as a problem with 41 per cent of these farmers. This is a reduction compared to the response of commercial farmers, largely because the operator of a miniature estate warrants more respect in the community than a commercial farmer and can thus more readily attract a labourer. However, these farmers frequently remark that it is increasingly difficult to obtain strong young men to work the land as they tend to look in preference for non-agricultural employment.

Levels of farming

As a farming system the miniature estate is more developed, efficient and scientific in its agricultural methods than is the commercial farm. In establishing levels of the farming practice on each farm, it is necessary to amend the criteria used to determine the three different levels noted on the previous categories. For example, the presence or absence of a given number of vegetables in the kitchen garden can no longer be an indication of their level of farming, since some of these farmers have advanced to a stage of specialization where they are no longer concerned with supplying their households with food. It is a problem to determine a set of criteria which define an 'average' miniature estate, as neither the selection of tools, nor use of fertilizers, are distinguishing features. It is with respect to the subjective evaluation of the farmer's attitude to agriculture, the visual impression of the condition of his cultivation and miscellaneous points which during

the course of the interview indicated sound agricultural knowledge and experience, that a classification is made. This assumes that all operators of miniature estates have a progressive approach to their farming and use scientific methods with their principal crops (exceptions are in parts of the kitchen garden where traditional methods of cropping are used). A farmer is classified as having an 'average' level of farming when he was noted as having a mediocre or keen attitude to farming (Questionnaire, Personal Observation Number 2), for being in the process of expanding the area under cultivation and for expressing knowledge about correct methods of cultivation without necessarily implementing them all. A farmer who has a keen attitude, has his land completely cultivated, demonstrates a sound agricultural knowledge and has the overt attributes of a successful farmer, is regarded as 'above average'. Given his resources few, if any, obvious improvements can be made, thus he represents the most efficient type of small farmer. When an operator of miniature estates was noted for having an unenthusiastic attitude to farming, for not having all the land in cultivation and not attempting to achieve this, and where his main crops show signs of neglect or improper attention, then he is classified as 'below average'.

It is a mark of the superiority of the miniature estate, that 53 per cent of these farms are classified as 'above average'. Such farms are present in all parishes, although St George's parish is notable in the placing of all three responding farmers in this group (Table 10.16). Only 14 per cent of the sampled miniature estates are graded as 'below average', and these belong either to young farmers who have little

experience in farming and who have recently inherited the land, or to old farmers who have no successors to manage or work their land efficiently and who are therefore unable to maintain their land in the best condition.

There are no discernible differences between the parishes, save St George's with its consistently high standard. This is indicative of the homogeneity of this farming category. It also suggests that levels of farming on miniature estates are not influenced by, and do not reflect, the social and economic landscape in general. Personal qualities of initiative, intelligence and determination are more important, and have enabled the operators of miniature estates to overcome certain restrictions this landscape may impose.

TABLE 10.16 MINIATURE ESTATES: EVALUATION OF LEVELS OF FARMING

		Farming levels		
Parish	No. of farms	Below average	Average	Above Average
St George's	3	-	-	3
St John's	10	1	4	5
St Mark's	8	2	3	3
St Patrick's	4	-	2	2
St Andrew's	8	2	2	4
St David's	3	-	1	2
Total	36	5	12	19
% of miniature estates	100	14	33	53

Conclusion

Within the farming community the operator of a miniature estate is a 'big man' who is respected as a leading and knowledgeable farmer. His leadership and influence within this community is recognised by the Extension Service of the Department of Agriculture, as it has appointed six of these operators to be 'key' or model farmers in their districts. This recognition is something farmers in the other categories do not receive and it provides further evidence of the superiority of the operators of miniature estates. Such 'key' farmers serve as a liaison between the Extension Service and other small farmers. On their miniature estates they demonstrate correct methods of farming, in anticipation that lesser farmers may be impressed and sufficiently interested to improve their own farming technique. Many other operators of miniature estates serve a similar function in an unofficial capacity, as they bridge the social and economic gap between the estates proper and the other categories of small farmers. Whereas the operator of a miniature estate will model his farming system upon that of a prosperous estate, so in turn may a semi-commercial or commercial farmer imitate the cultivation practices and crop emphasis of a miniature estate with which he can more readily identify his farming system.

Yet, the social background of the operator of a miniature estate is distinguished by higher educational attainments, greater experience in positions overseas, and more varied membership in racial and religious groups. Consequently, he has a higher level of economic motivation and achievement (as indicated by his level of living) and

a progressive approach to farming. The traditional set of values and attitudes noted among the other farmers are no longer present at this level. Hence, new methods of cultivation or improved strains of plants are assimilated after the farmer has evaluated them, so that his agriculture is more advanced and his land-use more efficient.

Production from miniature estates is almost totally restricted to export crops, principally cocoa. St George's parish differs in that vegetables and sugar cane are important crops. With this degree of specialization and the economic security of these farmers, there is no longer the concern to supply the household with foodstuffs, and consequently vegetable cultivation in the kitchen garden and provision grounds declines. Nevertheless, these farms are outstanding and consistently exhibit high levels of farming. They are a testimony of what can be accomplished in small farming.

CHAPTER 11

SUMMARY OF THE AGRICULTURAL ASPECTS OF SMALL FARMING

Introduction

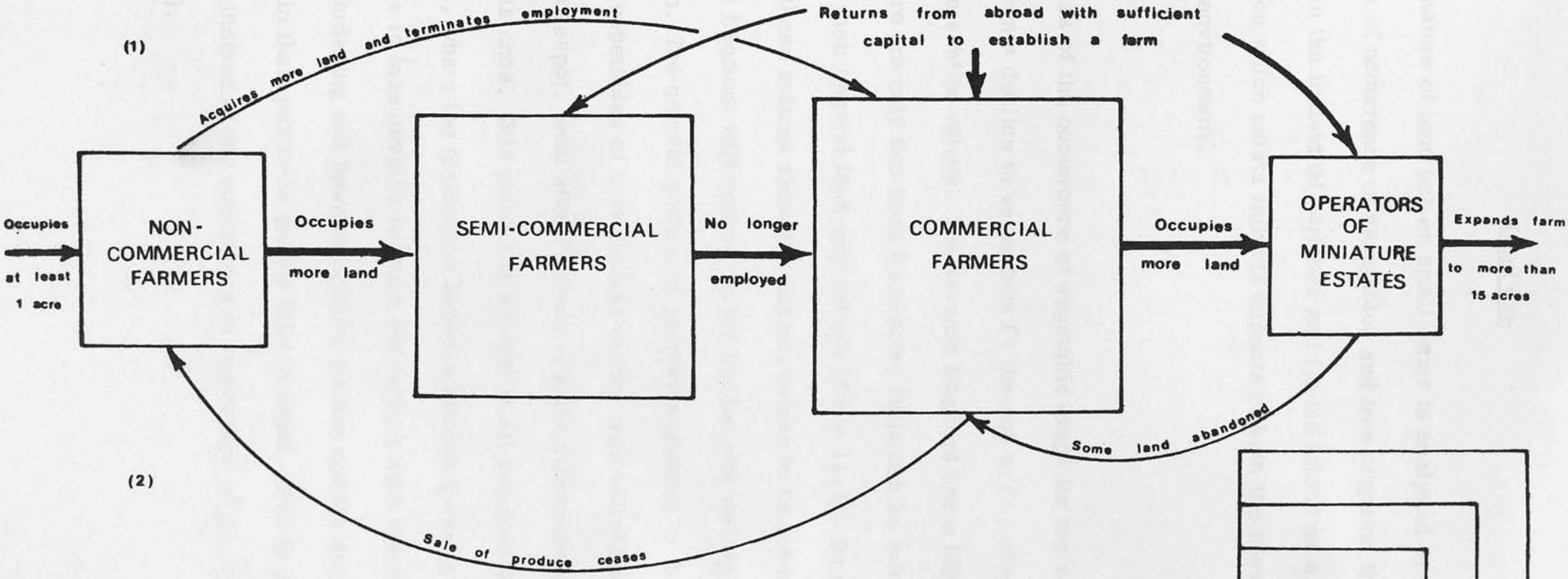
The four previous chapters were concerned with describing and analyzing the structure and nature of four types of small farms, so that more thorough investigation and greater appreciation could be made of the subject. In this chapter a synthesis of these farm types is made and a composite description made of small farming. Particular attention is given to distinguishing and explaining differences between the parishes which hitherto had been mentioned, and possibly distorted by differences in the size of the sample. This chapter, in analyzing aspects of small farming, is principally concerned with the nature of land use and cash crops, the distribution of livestock, tools and farming practices, and levels of farming. The chapter concludes with a comparison between the general level of farming practice in a parish and the position that parish holds in the hierarchy of social-economic development. Since the social structure of the farmers was the basis of Chapter 5, it receives only cursory mention in connection with the question of mobility between the types of farms. Discussion of this topic forms the first part of this chapter.

Social aspects

As each category of farm is theoretically linked to the others, movement between these categories is possible, and often inevitable. For instance, a semi-commercial farmer who is no longer employable because of old age or poor health automatically becomes a commercial farmer without occupying any additional land. Movement between the categories, however, is usually the result of a farmer's desire to develop his farm unit and to enhance his position in the rural society by demonstrating his independence. Farmers, who in the foregoing chapters have shown the greatest upward mobility, 1) have a certain minimum level of formal education, usually above the third standard, 2) possess the ability either to be craftsmen, such as carpenters or stone-masons, or to hold positions of responsibility, such as overseers and managers on estates, 3) have enough foresight and initiative to possibly get themselves overseas in order to save more rapidly than they could in Grenada, and 4) possess a drive to succeed which seems to be partly related to their religious and racial associations. As the identification of these characteristics is considered to be a major contribution in this study it is discussed in more detail in the concluding chapter.

Figure 18 clearly shows the main streams of movement between the four types of farms and indicates that although movement is usually progressive, it can also be retrogressive.

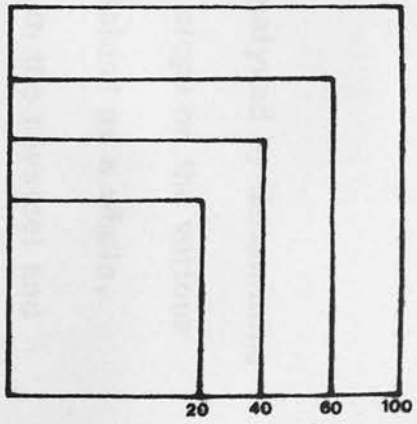
SCHEMATIC DIAGRAM SHOWING LINES OF MOVEMENT BETWEEN CATEGORIES OF SMALL FARMS



1. Growth of farm usually through purchase or inheritance of land
2. Decay of farm due to old age and inability to work land

Main line

Secondary line



Land use

The nature of land use on small farms is analyzed by determining the indices of occurrence of vegetables and tree crops on the various fragments in the individual parishes and for the island as a whole. The variation which exists reflects aspects of both the physical and the social environment.

Vegetables

Indices of the occurrence of vegetable crops for the various numbered fragments decline in value from F1 through to F4, after which F5 and F6 have similar values. The seventh fragment has a higher index, but, as there are only two such fragments, little can be inferred from them about their general land-use pattern (Table 11.1). As might be expected, these indices show the kitchen garden to be the most intensively used fragment with respect to the number and variety of vegetables grown. The general pattern on provision grounds is for them to have fewer vegetables of more limited variety with increasing distance from the housespot, until after F4 there is little difference with increase in distance. This pattern is evident in all parishes except in St George's, where the distinction between kitchen gardens and provision grounds is less obvious because the farmers here specialize in vegetable gardening and therefore grow a greater number and variety of vegetables in their provision ground than is usual. This is indicated by the high indices of the occurrence of vegetables on F2, F4 and F5 (Table 11.1).

TABLE 11.1 VEGETABLE CROP OCCURRENCE ON ALL SMALL FARMS

Parish	Fragment number	Number of fragments	Tropical roots & tubers							Temperate roots				Green leaf		
					Ground provisions											
			Arrowroot	Cassava	Dasheen	Eddoes	Sweet potatoes	Tannias	Yams	Beetroot	Carrots	Onions	Radishes	Cabbages	Celery	Lettuce
St George's	1	52	1	23	22	15	26	14	33	3	10	1	1	13	19	6
	2	28	-	10	8	6	12	21	21	2	7	1	2	6	7	1
	3	18	-	4	4	2	4	5	8	1	1	-	-	2	2	-
	4	6	-	2	2	2	3	4	3	2	1	-	-	1	1	1
	5	3	-	-	-	-	1	2	1	1	1	-	-	-	-	-
	6	1	-	-	-	-	1	-	1	-	-	-	-	-	-	-
	7	1	-	-	-	-	-	1	-	1	1	1	-	-	-	-
St John's	1	38	-	3	18	1	20	8	20	-	3	-	-	4	8	-
	2	32	-	-	9	-	14	6	12	1	-	-	1	4	2	-
	3	14	-	-	3	2	2	2	8	-	2	-	1	-	2	-
	4	8	-	1	4	-	4	1	3	-	1	-	-	2	1	-
	5	5	-	-	-	-	1	1	1	-	-	-	-	2	1	1
	6	1	-	-	1	-	1	-	1	-	-	-	-	-	-	-
St Mark's	1	21	-	3	9	2	11	2	-	-	-	-	-	1	2	-
	2	19	-	7	1	-	9	3	-	-	-	-	-	1	-	-
	3	8	-	-	1	-	4	-	-	-	-	-	-	1	-	-
	4	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-
St Patrick's	1	46	-	18	18	2	29	14	11	5	3	1	2	7	14	2
	2	22	-	6	5	4	12	11	14	1	-	-	1	2	1	1
	3	15	-	1	-	1	3	-	2	-	-	-	-	-	-	-
	4	4	-	1	-	-	1	-	1	-	-	-	-	-	-	-
	5	2	-	1	2	-	1	1	-	-	-	-	-	-	-	-
St Andrew's	1	86	-	13	42	-	41	24	46	2	-	-	-	12	14	2
	2	68	-	22	22	3	33	7	31	-	-	-	-	3	2	-
	3	39	-	9	8	1	16	7	13	-	-	-	-	2	3	-
	4	12	-	1	6	-	1	-	6	-	-	-	-	-	-	-
	5	4	-	1	3	-	-	-	3	-	-	-	-	-	-	-
	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St David's	1	49	-	13	24	4	33	26	37	1	1	-	-	11	15	1
	2	37	-	14	6	3	11	13	17	2	2	-	1	7	3	1
	3	32	-	12	9	1	14	13	18	1	1	-	-	4	3	-
	4	12	-	1	3	-	-	-	4	-	-	-	-	-	-	-
	5	5	-	-	1	-	-	-	2	-	-	-	-	-	-	-
	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-
Total	1	292	1	70	133	24	160	88	147	11	17	2	3	48	73	11
	2	206	-	59	51	16	91	61	95	6	9	1	5	23	15	3
	3	126	-	26	25	7	43	27	49	2	4	-	1	9	10	-
	4	45	-	8	15	2	9	5	17	2	2	-	-	3	2	1
	5	19	-	2	6	-	3	4	7	1	1	-	-	2	1	-
	6	4	-	-	1	-	2	-	2	-	-	-	-	-	-	-
	7	2	-	-	1	-	2	1	-	1	1	1	-	-	-	-

TABLE 11.1

Parish	Fruit and pod											Others		Index of occurrence	Number of different crops
	Corn	Cow peas	Cucumber	French beans	Groundnuts	Melogene	Okra	Peppers	Pigeon peas	Pumpkins, melons	Tomatoes	Seasoning	Sugar cane		
St George's	8	17	10	6	27	12	27	22	37	3	31	11	14	.28	27
	4	9	8	2	17	3	8	5	24	1	7	3	3	.28	26
	1	2	1	2	3	1	-	1	7	-	3	2	2	.12	22
	1	1	2	-	-	-	3	1	2	-	3	3	1	.25	20
	1	-	-	-	2	1	1	2	1	1	1	1	2	.23	15
	-	-	-	-	-	-	-	-	-	-	-	-	1	.11	3
	1	1	1	-	1	1	1	1	1	-	-	-	-	.52	12
St John's	2	4	5	1	6	1	12	9	20	1	8	4	3	.16	22
	-	6	3	-	5	-	6	4	9	1	7	2	-	.11	17
	1	3	-	3	1	-	1	4	4	1	4	1	-	.12	18
	-	3	1	-	2	-	1	-	4	-	2	1	-	.14	12
	-	1	1	-	1	1	1	-	1	1	1	-	-	.11	14
	-	-	-	-	-	-	-	-	-	-	-	-	-	.11	3
St Mark's	-	2	2	2	1	-	5	3	9	-	7	2	-	.11	16
	-	2	1	-	8	2	1	-	10	-	2	1	1	.10	14
	-	2	-	-	2	-	1	-	2	-	2	-	-	.07	8
	-	1	-	-	1	-	-	1	1	-	-	-	-	.07	5
St Patrick's	5	12	17	-	27	10	18	21	30	-	22	7	7	.24	24
	1	5	4	2	15	1	9	3	18	-	6	-	4	.21	22
	-	-	-	1	-	-	-	-	2	-	-	-	-	.02	6
	-	1	-	-	-	-	-	1	1	-	-	-	-	.06	6
	-	-	-	-	1	-	-	-	1	-	-	-	-	.13	6
St Andrew's	7	15	18	3	30	6	25	20	53	-	30	7	2	.18	21
	8	11	8	1	22	2	6	5	31	-	12	2	2	.13	20
	5	9	6	1	13	3	5	2	16	-	6	-	-	.12	18
	-	-	-	-	2	-	-	-	2	-	-	-	-	.06	6
	-	-	-	-	1	-	-	-	1	-	-	-	-	.08	5
	1	-	1	-	1	-	-	-	1	-	-	-	1	.18	5
St David's	2	14	14	-	19	4	24	15	45	-	21	8	7	.26	22
	2	9	8	2	19	1	8	4	26	2	14	5	5	.18	25
	5	10	6	1	12	3	6	4	11	-	8	1	-	.16	21
	-	-	-	-	1	-	-	-	2	-	1	-	-	.04	6
	-	1	1	-	-	-	-	-	-	-	-	-	-	.04	4
	-	-	-	-	-	-	-	-	-	-	-	-	-	.00	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	.07	2
Total	24	64	66	11	110	33	111	90	185	4	119	39	33	.21	27
	15	42	32	7	86	9	38	21	118	4	48	13	15	.16	26
	12	16	7	8	31	7	13	11	42	1	23	24	2	.12	24
	1	4	2	-	6	-	4	3	12	-	6	4	1	.09	21
	1	2	2	-	4	2	2	2	3	2	2	1	2	.10	21
	1	-	1	-	1	-	-	1	1	-	-	-	2	.11	9
	1	1	1	-	1	1	1	1	1	-	-	-	-	.28	14

In the parishes of St George's, St Patrick's and St David's, kitchen gardens are better developed than those in the other parishes, as all have indices above the mean of .21. This development is mainly attributable to a more favourable physical environment, where the variation in topography and rainfall, together with the presence of cultivable soils, allow a range of vegetables to be grown.

Those crops most commonly found in kitchen gardens are those, in addition to rice, which are most often to be seen on the shopping lists of the average woman, who has no kitchen garden of her own, as she goes to market to purchase vegetables for her household. These vegetables include pigeon peas, ground provisions (namely tannias, yams and dasheen), tomatoes, okra and corn. Some regional variation exists, as temperate root crops are cultivated principally in St George's and St Patrick's parishes, but rarely in St Mark's or St Andrew's, while eddoes are almost exclusively grown in St George's. The kitchen garden is least developed in St Mark's parish, as the index of occurrence, .11, and the number of different vegetables grown, 16, are considerably lower than the comparable figure in other parishes. The explanation for this paucity of vegetable crops is the absence of suitable soils and slopes for their cultivation (Tables 2.1 and 2.2).

The provision grounds on F2 have less variety and fewer vegetables than the kitchen gardens, as denoted by its index of occurrence, .16. A major difference between these two parcels of land is the sharp decline in the presence of certain crops on F2. For instance, tomatoes occur on 41 per cent of the kitchen gardens, but are found on only 23 per cent of the second fragments. Other crops with a similar lower

frequency of occurrence include peppers, melogenes, lettuce and seasoning, all of which require regular attention during their growing season and are consequently prized crops. Pigeon peas remain the most common crop on F2, although yams, tannias and corn are also present on more than one-third of these fragments. On fragments F3 to F6, the occurrence of temperate roots, green leaf and fruit vegetables shows a more rapid decline than that of ground provisions, corn and pigeon peas. That yams and dasheen predominate over corn and pigeon peas on F4 and F5, is an indication of the fact that these fragments are at higher elevations where the air is more humid and not amenable to the ripening of corn and pigeon peas.

Thus, land use on the various fragments indicates a variation on the Von Thünen concept; the closer the fragment is to the home, the greater the likelihood that it will contain a larger number of vegetables, especially those which are more labour intensive in their production, have more frequent domestic use and do not store well.

Tree crops

The distribution of tree crops on various fragments follows a similar pattern to that of vegetables, as the index of occurrence is highest on F1, .49, thereafter decreasing to .29 for F3. On F4 this index increases to .36, a level which is maintained on subsequent fragments (Table 11.2). The reason for the index showing an unexpected rise for F4 is not clear, although the explanation is thought to be associated with the fact that farms having four or more fragments belong to the more successful commercial farmers and operators of

TABLE 11.2 TREE CROP OCCURRENCE ON ALL SMALL FARMS

Fragment no.	No. of fragments	Avocado pear	Bananas	Breadfruit	Cocoa	Coconut	Lime	Other citrus	Mango	Nutmegs	Sapodilla	Other fruits	Index of occurrence
St George's parish													
1	52	24	33	31	21	48	15	31	32	9	2	12	.43
2	28	9	15	11	9	25	4	11	22	6	1	-	.37
3	18	5	9	3	6	5	1	1	8	4	2	1	.23
4	6	3	2	2	1	5	1	-	4	3	1	1	.35
5	3	2	1	1	-	2	-	2	2	-	-	1	.33
6	1	-	1	-	-	-	-	-	-	-	-	1	.18
7	1	-	-	-	-	1	1	-	1	-	-	-	.27
St John's parish													
1	38	14	34	23	25	24	12	24	19	24	3	10	.51
2	32	12	25	17	22	15	5	16	16	24	2	7	.46
3	14	5	10	10	8	6	3	5	5	10	1	2	.42
4	8	2	6	4	1	2	-	2	2	3	-	-	.25
4	8	2	6	4	1	2	-	2	2	3	-	-	.25
5	5	-	4	-	1	2	1	1	1	1	-	-	.20
6	1	-	-	-	1	1	-	-	-	1	-	-	.27
St Mark's parish													
1	21	10	18	15	15	17	10	10	12	12	1	2	.53
2	19	11	15	9	13	13	4	8	9	13	2	2	.42
3	8	6	6	4	4	3	-	3	4	5	-	2	.42
4	3	2	2	3	2	2	-	1	2	2	2	2	.61
St Patrick's parish													
1	46	30	45	33	23	36	16	23	33	22	6	16	.47
2	22	11	16	17	10	20	3	10	15	18	2	4	.44
3	15	2	7	3	3	5	1	3	3	4	2	1	.21
4	4	-	4	2	-	2	1	-	3	2	1	-	.34
5	2	1	2	1	1	-	-	1	3	1	-	1	.50

TABLE 11.2

Fragment no.	No. of fragments	Avocado pear	Bananas	Breadfruit	Cocoa	Coconut	Lime	Other citrus	Mango	Nutmegs	Sapodilla	Other fruits	Index of occurrence
St Andrew's parish													
1	86	29	72	64	60	60	15	39	47	46	8	11	.48
2	68	21	51	33	44	36	4	19	26	42	6	5	.38
3	39	12	22	18	11	24	3	8	15	22	2	5	.33
4	12	3	8	7	6	4	-	4	4	9	-	-	.34
5	4	-	1	2	1	1	-	-	3	2	-	-	.22
6	1	1	-	1	-	1	-	-	1	-	-	-	.27
St David's parish													
1	49	19	43	39	37	37	9	22	39	23	8	13	.47
2	37	9	18	19	17	23	5	7	21	14	2	7	.35
3	32	6	15	13	7	9	2	3	11	12	2	3	.24
4	12	5	7	5	7	6	-	1	6	8	2	2	.37
5	5	-	3	4	3	3	-	1	1	5	1	1	.40
6	1	-	1	-	1	1	-	-	-	1	-	1	.45
7	1	-	1	-	1	-	-	-	-	1	-	1	.36
Total													
1	292	126	245	205	181	222	77	127	182	136	28	64	.49
2	206	73	140	106	115	132	25	71	82	117	15	25	.40
3	126	34	73	51	39	52	10	23	46	57	9	14	.29
4	45	17	29	23	18	22	2	8	22	28	6	4	.36
5	19	3	11	4	6	8	1	5	10	9	1	2	.29
6	4	1	2	1	2	2	-	-	1	2	-	2	.30
7	2	-	1	-	1	1	1	-	1	1	-	1	.32

miniature estates, who cultivate a greater variety and number of crops on these fragments than do farmers having farms with only three fragments.

Differences between the parishes exist, as the index of occurrence varies from .43, in St George's, to .53 in St Mark's, i.e., an inverse relationship to the indices for vegetable crops. Thus, where the physical environment is poorly suited for vegetable gardening, as in St Mark's and St John's parishes, the farmers appear to cultivate a greater number and variety of trees in their kitchen gardens to compensate for their deficiency in vegetables.

The trees most commonly found on F1 are bananas and coconuts, which are found respectively in 84 per cent and 76 per cent of these kitchen gardens. Breadfruit, cocoa and mangoes are all found on more than 60 per cent of the kitchen gardens (Table 11.2). This distribution of trees indicates that small farmers attach more importance to having fruit trees in their kitchen garden than necessarily having trees which produce export crops.

On F2 the nature of land use changes, as trees producing export crops become the dominant feature. Bananas are present on 67 per cent of these fragments, followed by coconut on 64 per cent, and nutmegs and cocoa both on 56 per cent. There is a marked decline in the frequency of occurrence of trees whose fruit is prized, such as pawpaws, mangoes, limes and soursop, for fear that they could be readily stolen on a piece of land some distance from F1. On F3 the principal trees are bananas, present on 53 per cent of these fragments, nutmegs, 45 per cent, coconut, 41 per cent, and breadfruit, 40 per

cent. Cocoa, by contrast, is present on only 31 per cent, a decrease that is due to the tendency for higher numbered fragments to be at higher elevations where conditions become too humid for the successful cultivation of cocoa. This pattern is found on the remaining fragments, hence nutmegs rival bananas as the dominant tree crop, with cocoa being less frequently found than breadfruit, coconut and mango.

There is no appreciable difference in the distribution of tree crops between the parishes.

Cash crops

Consideration of the cash crops on semi-commercial farms, commercial farms and miniature estates indicates the nature of production and reveals patterns in the regional distribution of the major crops. The most common principal cash crop is cocoa, as it is the major earner of farm income in 37 per cent of the farms in these three categories. Nutmegs and bananas follow in order of importance, so that the triumvirate of export crops constitutes 73 per cent of the principal cash crops (Table 11.3). In contrast, food crops, including both vegetables and fruits, are unimportant cash crops, comprising only 15 per cent, while the remaining cash crops are sugar cane, coconut and limes.

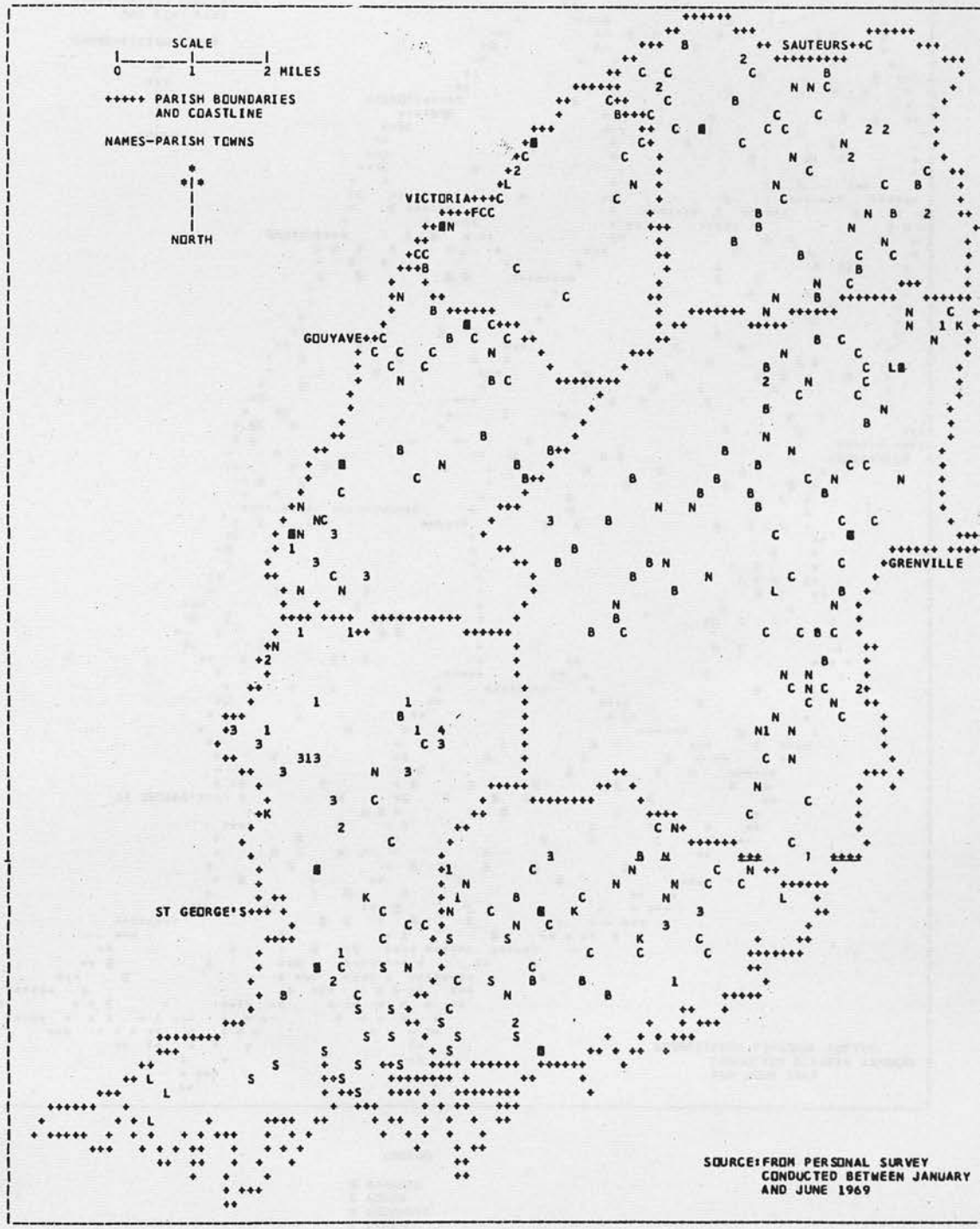
Only in St George's parish is cocoa not the main cash crop; here sugar cane and food crops are more important. Computer Map 4 illustrates this distribution and shows that farms on which cocoa is the main crop are concentrated in a middle-belt of elevation between the dry coastal area and the very humid mountainous interior. Farms

TABLE 11.3 CASH CROPS ON SMALL FARMS

(excludes Non-commercial farms)

Parish	Export crops: Bananas	Cocoa	Nutmegs	Limes	Coconuts	Cane	Ground provisions	Beans, corn, peas	Leaf and salad veg.	Temperate root crops	Other fruits	None
Principal cash crop												
St George's	-	8	2	3	1	12	6	2	8	1	-	-
St John's	6	14	7	-	-	-	1	-	3	-	-	-
St Mark's	2	13	2	-	-	-	-	-	-	-	1	-
St Andrew's	21	26	23	-	1	-	2	2	1	-	-	-
St David's	2	15	11	1	2	7	2	1	3	-	-	-
Total	39	93	53	4	4	19	11	11	15	1	1	-
% of total	15	37	21	2	2	8	4	4	6	-	-	-
Second cash crop												
St George's	2	4	6	-	1	2	4	8	4	1	3	7
St John's	9	6	11	1	-	-	-	-	1	-	2	1
St Mark's	5	3	6	-	-	-	-	-	-	-	1	3
St Patrick's	8	10	9	-	-	-	7	-	-	-	1	3
St Andrew's	14	22	26	-	3	-	2	-	1	-	1	6
St David's	4	11	9	-	2	2	4	4	1	-	1	6
Total	42	56	67	1	6	4	17	12	7	1	9	26
% of total	17	22	27	-	2	2	7	5	3	-	4	10
Third cash crop												
St George's	3	1	-	-	1	1	6	4	4	1	4	17
St John's	4	4	4	1	-	1	6	-	2	-	-	9
St Mark's	6	1	5	-	-	-	-	1	1	-	-	4
St Patrick's	13	3	6	1	1	-	1	1	1	-	1	11
St Andrew's	13	15	16	-	-	-	2	5	-	-	1	24
St David's	9	4	8	-	-	2	6	4	-	-	-	11
Total	48	28	39	2	2	4	21	15	8	1	6	76
% of total	19	11	16	1	1	2	8	6	3	-	2	30

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
PRINCIPAL CASH CROP



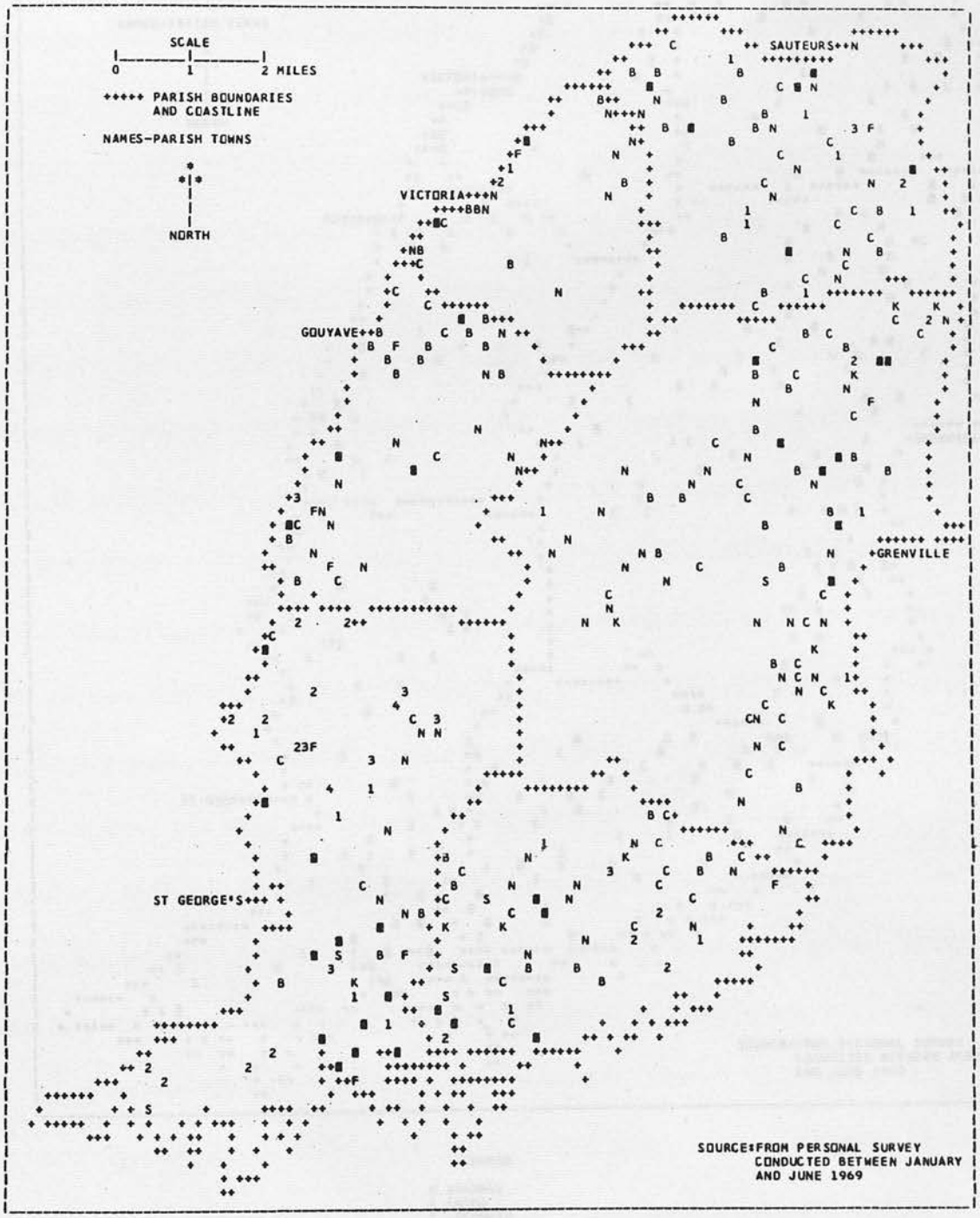
LEGEND

B BANANAS
C COCOA
K COCONUTS
L LIMES
N NUTMEGS
S SUGAR CANE
F OTHER FRUITS

1 GROUND PROVISIONS
2 BEANS PEAS AND MAIZE
3 LEAF AND SALAD VEGETABLES
4 TEMPERATE ROOT CROPS

COMPUTER MAP 4

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
SECOND CASH CROP



LEGEND

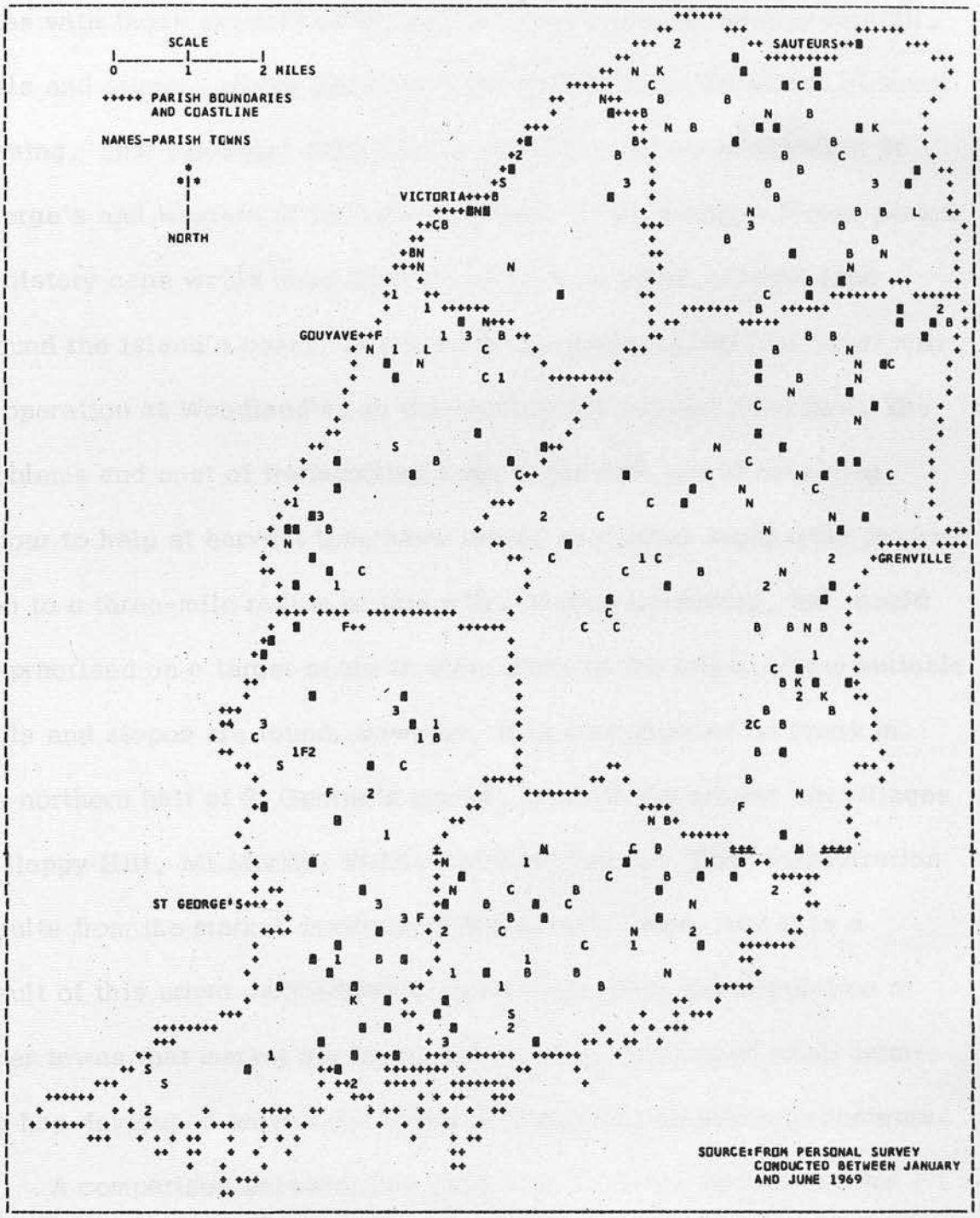
B BANANAS
C COCOA
K COCONUTS
L LIMES
N NUTMEGS
S SUGAR CANE
F OTHER FRUITS

1 GROUND PROVISIONS
2 BEANS PEAS AND MAIZE
3 LEAF AND SALAD VEGETABLES
4 TEMPERATE ROOT CROPS

■ NO SALE

COMPUTER MAP 5

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
THIRD CASH CROP



LEGEND

B BANANAS
C COCOA
K COCONUTS
L LIMES
N NUTMEGS
S SUGAR CANE
F OTHER FRUITS

1 GROUND PROVISIONS
2 BEANS PEAS AND MAIZE
3 LEAF AND SALAD VEGETABLES
4 TEMPERATE ROOT CROPS

∎ NO SALE

COMPUTER MAP 6

in the interior of the island are more likely to have nutmegs and bananas as their principal cash crops. This distribution of export crops complies with those aspects of the physical environment, namely rainfall, soils and slopes, which put severe limitations upon the nature of small farming. That the sugar cane belt is restricted solely to southern St George's and western St David's parishes, where during a former period in history cane would have been found on most areas of level land around the island's coast, is due to the presence of the last sugar mill in operation at Woodland's, in the heart of the present cane belt. The problems and cost of transporting cane to the mill and of obtaining labour to help at harvest time have served to restrict sugar cane production to a three-mile radius of this mill. Market gardening, too, could be practised on a larger scale in other parts of the island where suitable soils and slopes are found, however, it is concentrated on farms in the northern half of St George's parish, particularly around the villages of Happy Hill, Mt Moritz, Willis and Constantine. This concentration results from the market demands of St George's Town, and it is a result of this urban centre having about three times the population of other towns that market gardening as a distinct feature of small farming has developed around the towns of Grenville, Gouyave or Sauteurs.

A comparison between Computer Map 5, which illustrates the distribution of the second cash crop on the farms, and Computer Map 4, shows that farmers with an export crop as their first cash crop invariably have another export crop as their second. Where cocoa is their main cash crop, either bananas or nutmegs are their second, and in the interior of the island where nutmegs are a major crop, bananas

become a second, and vice-versa. Cane farmers rarely have a second crop and where they do it is usually vegetables. Thus, export crops remain the dominant feature of the second cash crop, although nutmegs are the most important crop (Table 11.3). Of the parishes, St George's maintains its unique character with respect to the nature of production, in that food crops are more common than export crops.

Reference to the third cash crop shows that the proportion of farmers who name export crops declines from the 66 per cent noted for the second cash crop, to 46 per cent, while those selling no crop increases to 30 per cent and those producing food crops remains constant at 19 per cent (Table 11.3). As bananas are the most common third crop, the triumvirate of export crops is complete, since cocoa is the most important cash crop and nutmegs the second. Food crops are a third cash crop in all parishes, principally in St George's, St John's and St David's. Computer Map 6 shows the emergence of minor areas of vegetable gardening around market towns, namely St George's, Gouyave, and to the south of Grenville.

The spatial distribution of crop production on small farms is therefore a reflection of both physical and cultural features on the island, as production of export crops is closely associated with conditions of climate, while that of food crops and cane is also affected by terrain and the proximity of their markets.

Livestock

Some livestock are present on over four-fifths of the small farms. Fowls are the most common; they are found on 77 per cent of the farms

and are raised principally for their meat. The distribution of these birds is widespread and has no distinct pattern of distribution (Computer Map 7). The other animals kept on these farms are less frequently found and occur in such small numbers as to make the keeping of livestock a relatively unimportant feature on most holdings (Table 11.4). Generally, most animals are kept for domestic use and occasionally as a source of ready cash, should it be required in an emergency. Of the parishes, St George's is outstanding in respect of the proportion of livestock, as it has the highest ratios per household of dairy and beef cattle, meat goats and sheep. However, this parish has few milch goats and donkeys, probably because of the large numbers of cattle and sheep supplying milk and manure. Of the other parishes, St Andrew's is notable for its low ratios of quality livestock, cattle, and sheep (fear of theft was the most commonly heard excuse for this fact), and St Mark's and St Patrick's for their high number of sheep.

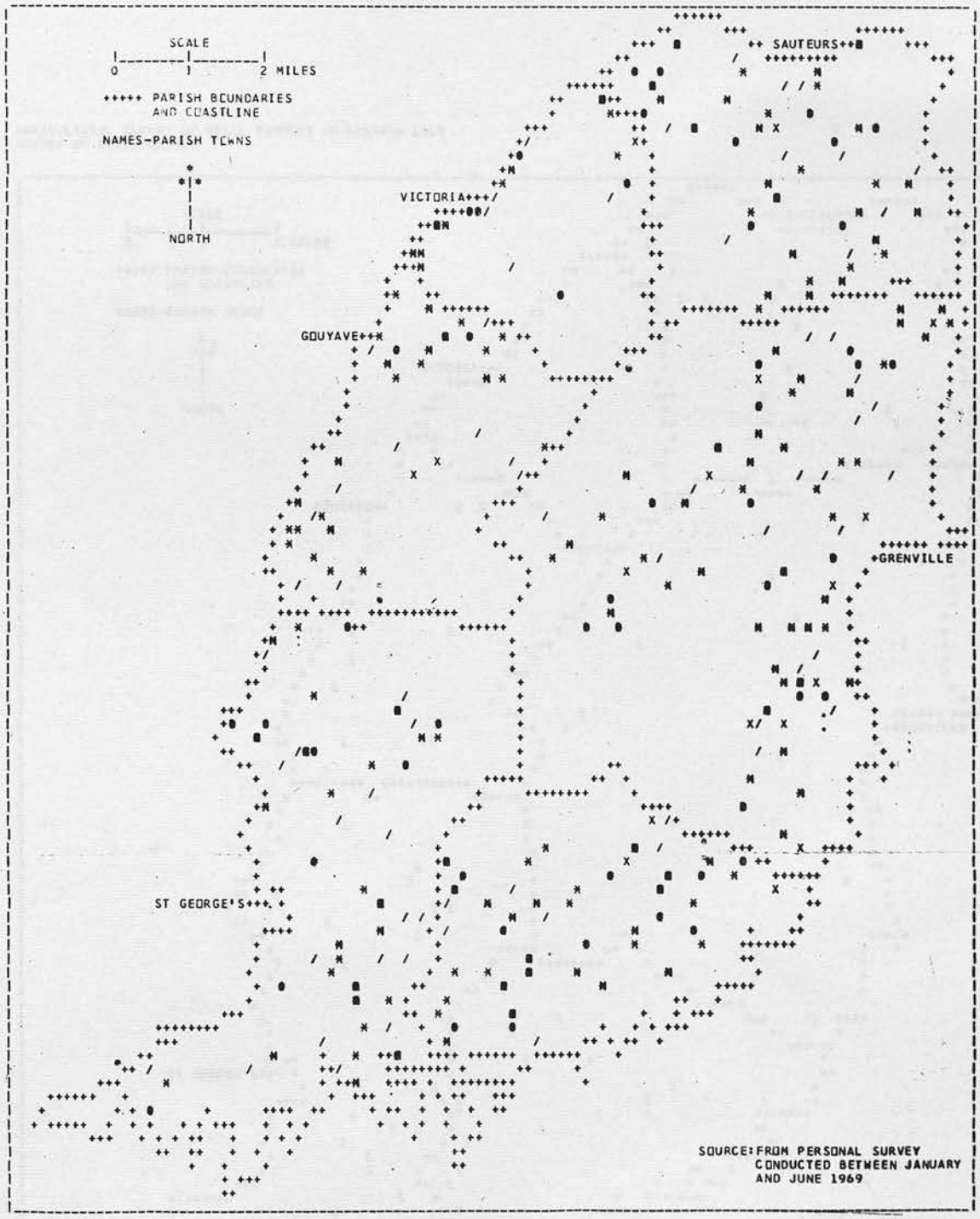
The distribution of the various types of livestock on the individual farms is shown by Computer Maps 7 to 15. They illustrate four major features, viz.: 1) cattle are mainly confined to the cane belt, and to a lesser extent on vegetable producing farms in Mt Moritz, Willis and Constantine, the north-west corner of St Patrick's, and around Corinth, St David's; 2) goats are often present in the same areas as cattle, but not necessarily on the same farms; 3) sheep are found predominantly in the drier parts of St George's and St Patrick's parishes; and 4) pigs and donkeys are distributed throughout the sample. There is some relationship between the type of livestock kept on a farm and the nature of that farm's production. The best example is provided

TABLE 11.4 RATIOS OF LIVESTOCK PER HOUSEHOLD

Parish	Fowls/household	Dairy cattle	Beef cattle	Milch goats	Meat goats	Pigs	Sheep	Draught donkeys	Manure donkeys
St George's	10.2	.67	.52	.05	.40	.69	.73	.10	.10
St John's	7.6	.21	.18	.31	.34	.60	.21	.29	.13
St Mark's	9.3	.38	.14	.09	.38	.52	.67	.33	.19
St Patrick's	7.5	.33	.22	.28	.22	.73	.61	.24	.13
St Andrew's	7.8	.15	.12	.17	.16	.69	.16	.17	.16
St David's	15.3	.30	.33	.12	.29	.78	.33	.18	.18
Total	9.8	.32	.25	.17	.27	.73	.40	.20	.15

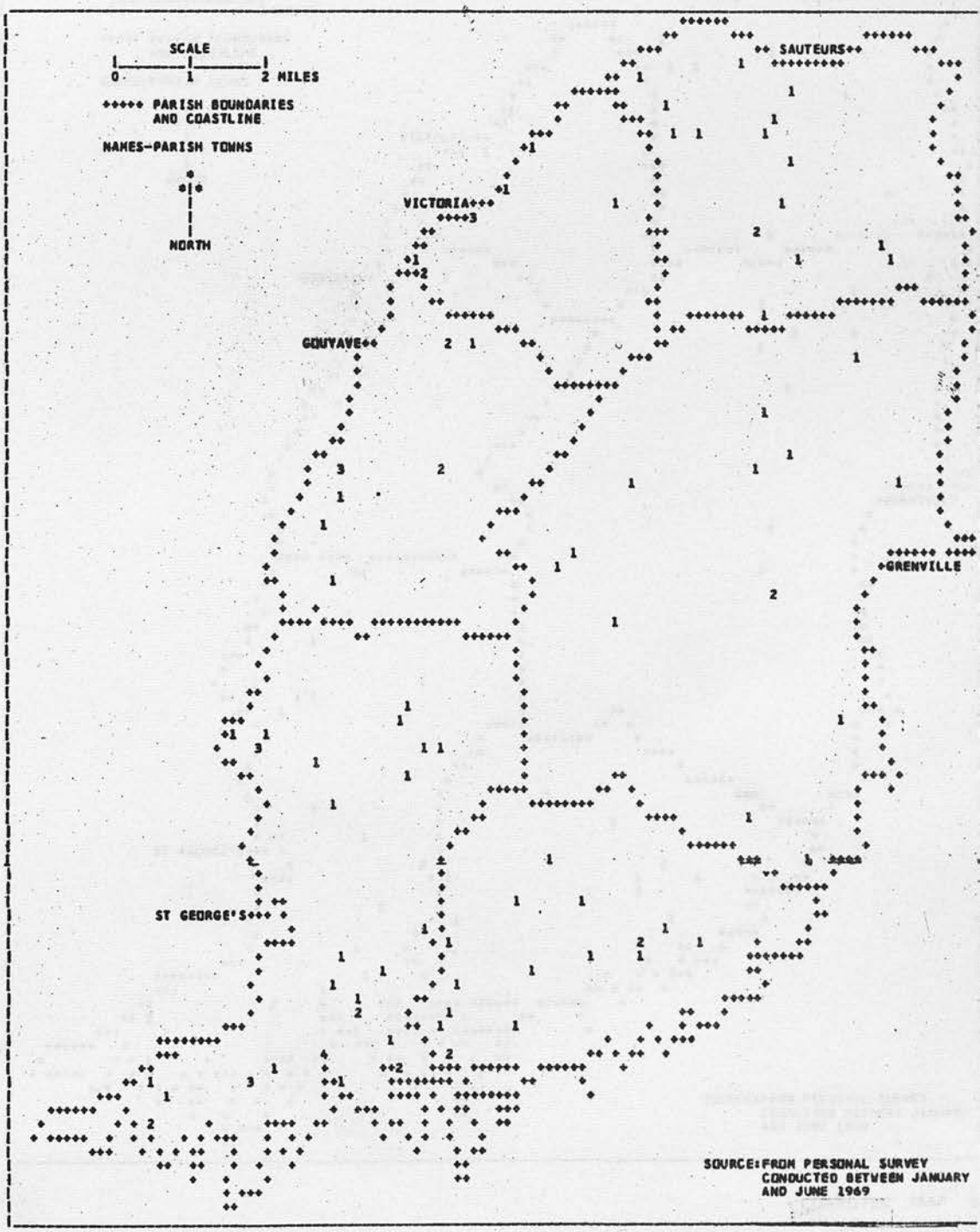
by producers of sugar cane who have a greater number of cattle and goats than other farmers. These farmers feed their cattle on the bagasse from the cane fields, a cheap source of fodder which is not readily available elsewhere on the island. Sheep are kept because they can tolerate the dry conditions, and are kept in preference to goats because their meat is of higher quality. Cattle are also associated with the producers of vegetable crops in St George's parish. There are several possible reasons for this association: 1) the availability of some fodder crops, such as the stalks of corn or vines of sweet potatoes after harvesting and of bruised or pest-damaged produce which cannot be sold in the market; 2) the grazing land which can result from fallow rotation

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
NUMBER OF FOWLS KEPT ON FARMS



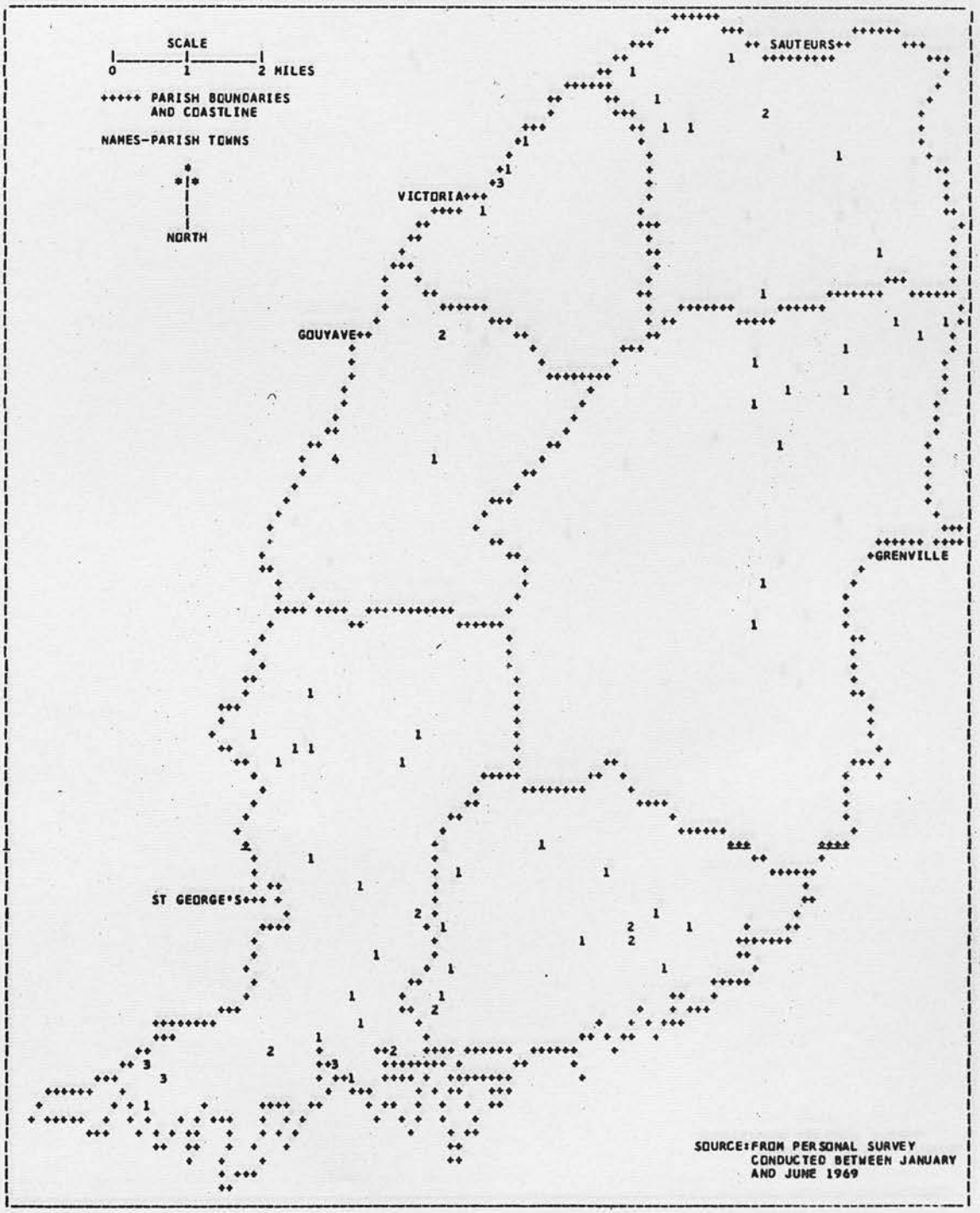
COMPUTER MAP 7

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
NUMBER OF DAIRY CATTLE



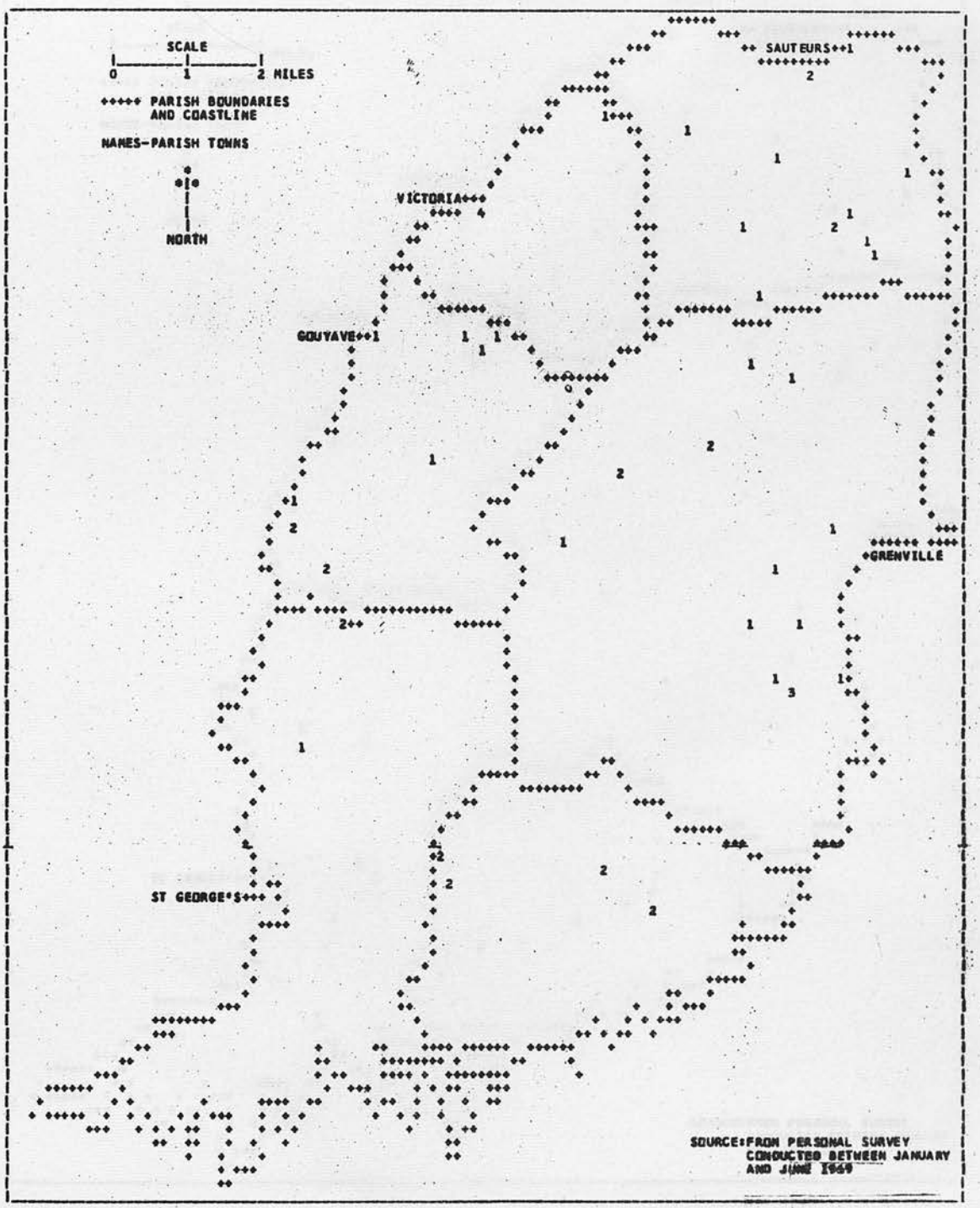
COMPUTER MAP 8

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
NUMBER OF BEEF CATTLE KEPT ON FARMS



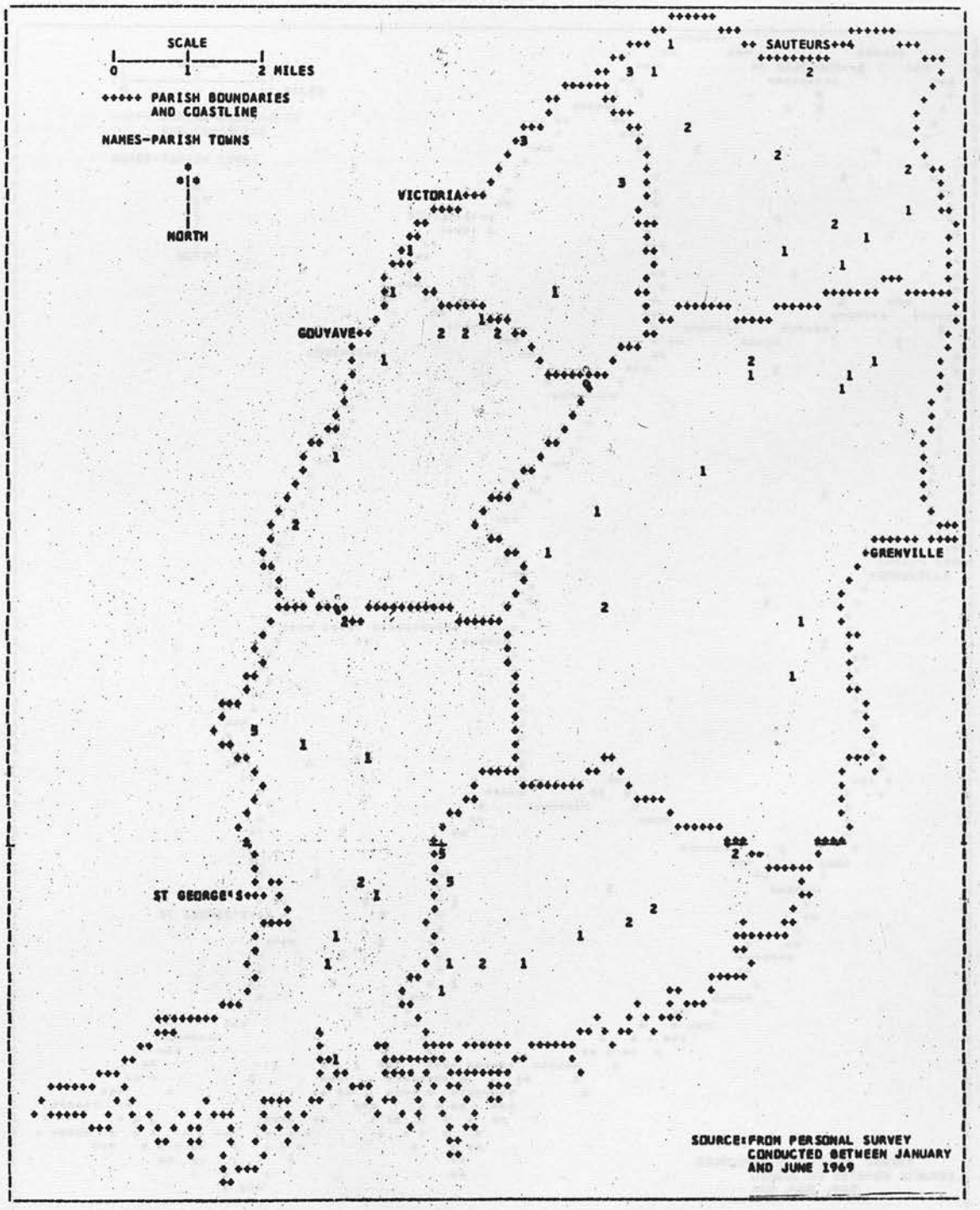
COMPUTER MAP 9

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
NUMBER OF MILCH GOATS KEPT ON FARMS



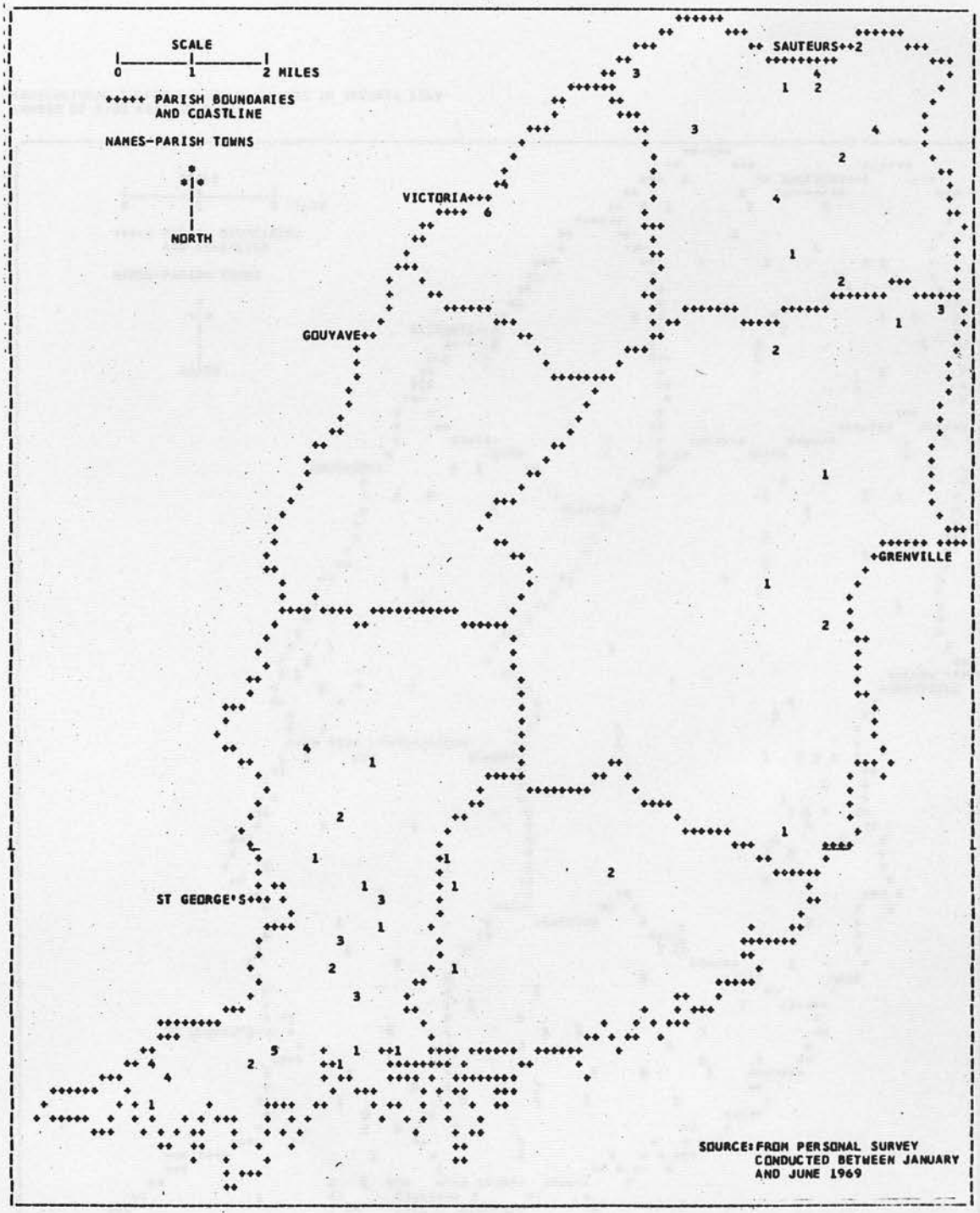
COMPUTER MAP 10

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
NUMBER OF MEAT GOATS KEPT ON FARMS



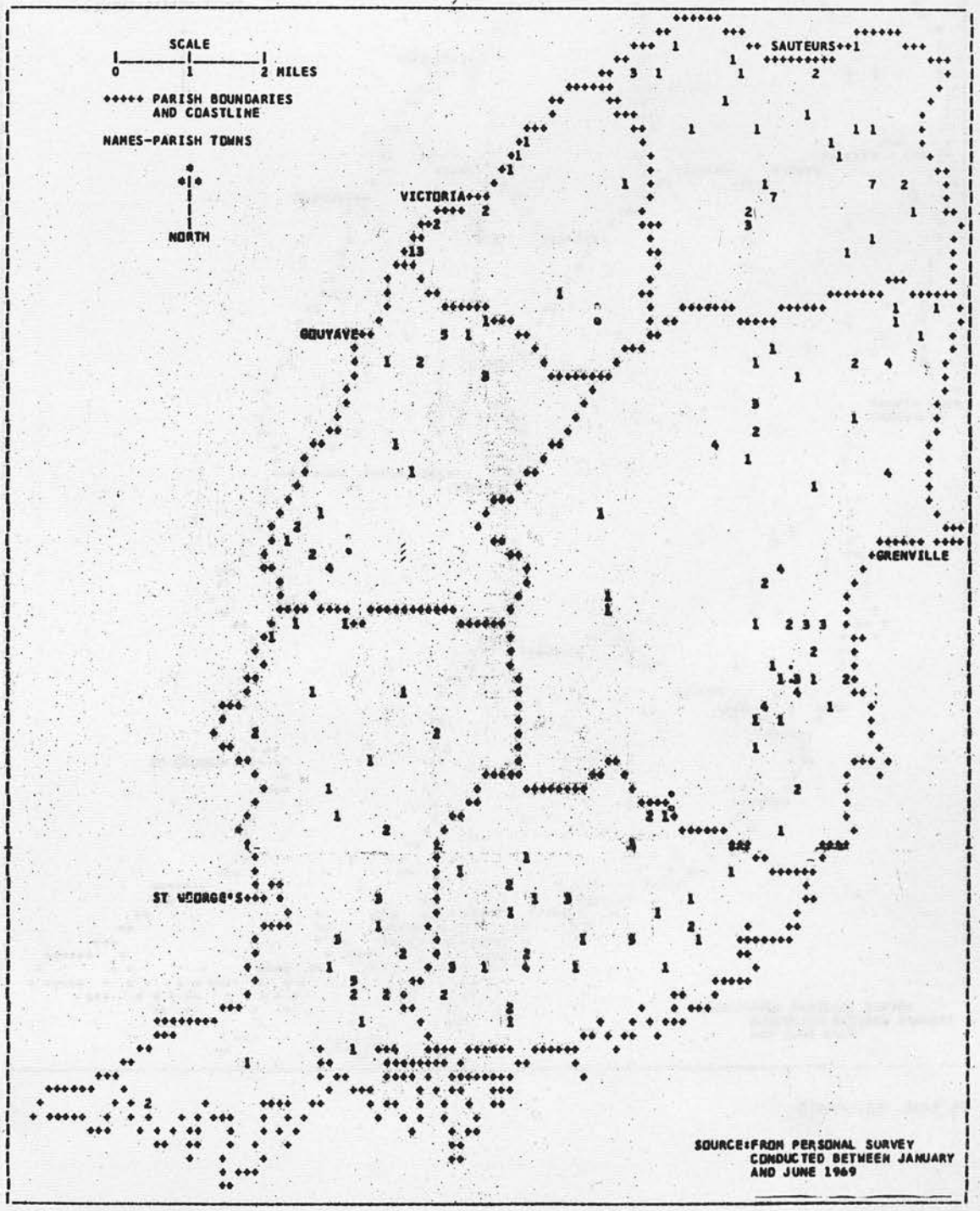
COMPUTER MAP II

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
NUMBER OF SHEEP KEPT ON FARMS



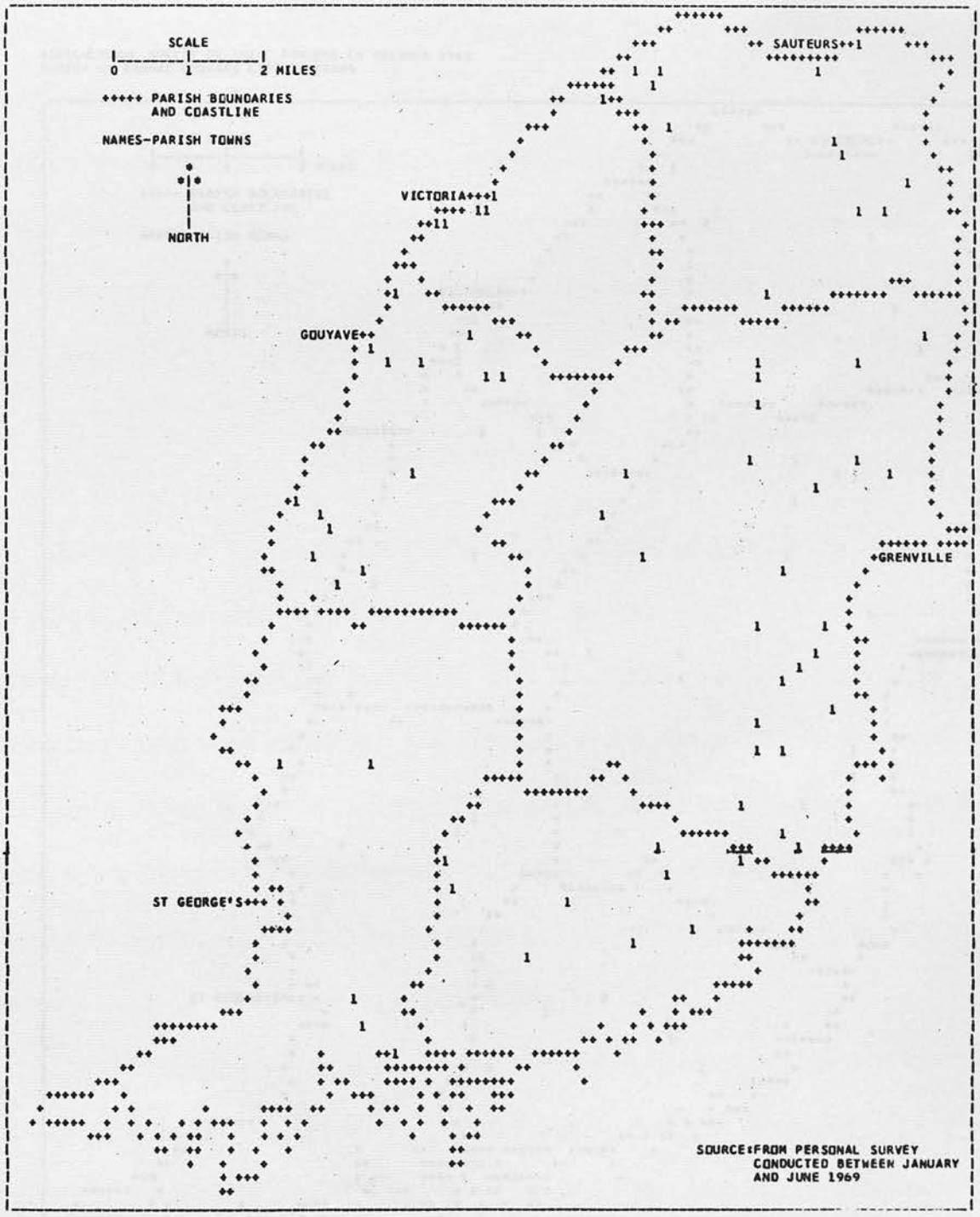
COMPUTER MAP 12

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
NUMBER OF PIGS KEPT ON FARMS

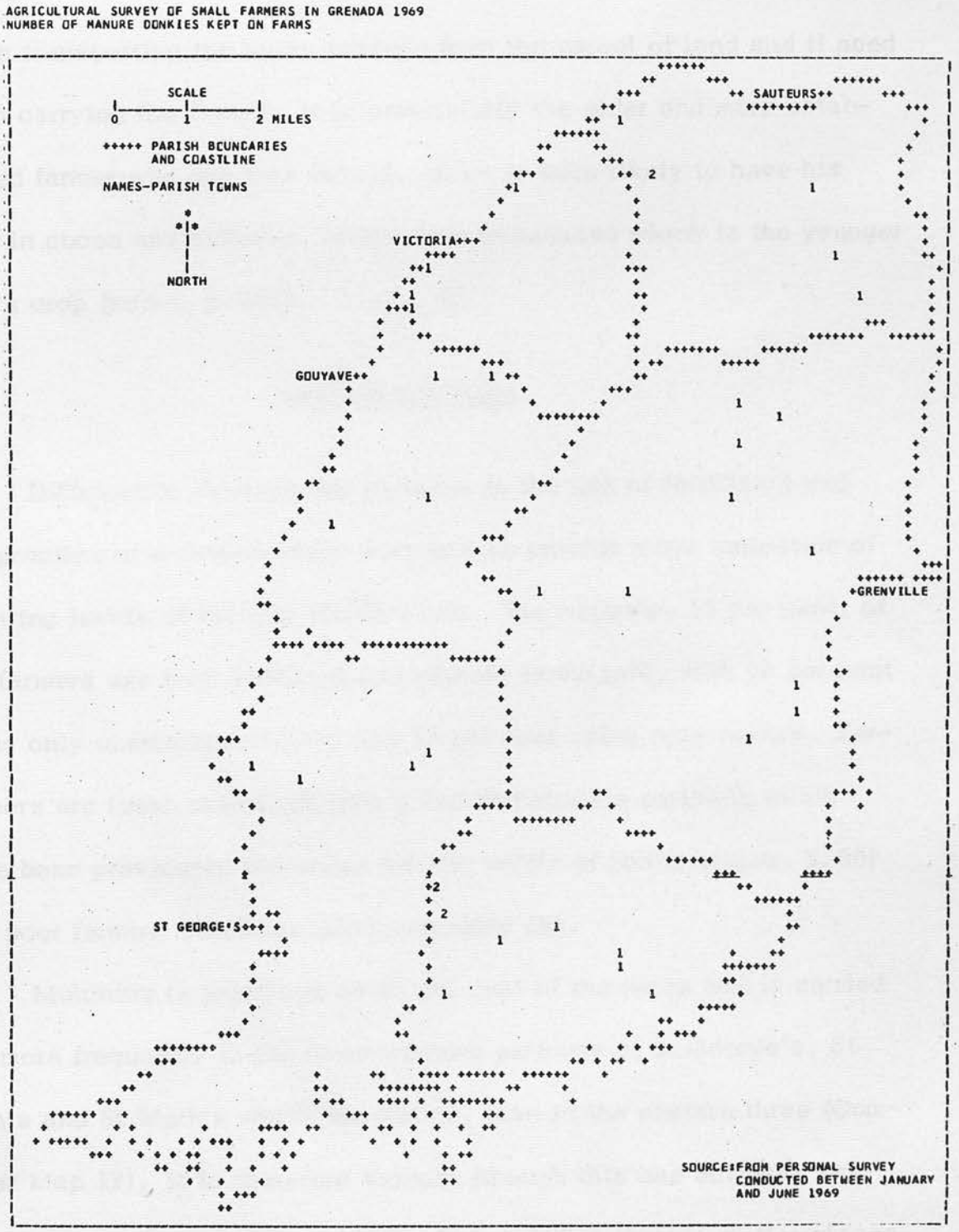


COMPUTER MAP 13

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
NUMBER OF DRAUGHT DONKIES KEPT ON FARMS



COMPUTER MAP 14



COMPUTER MAP 15

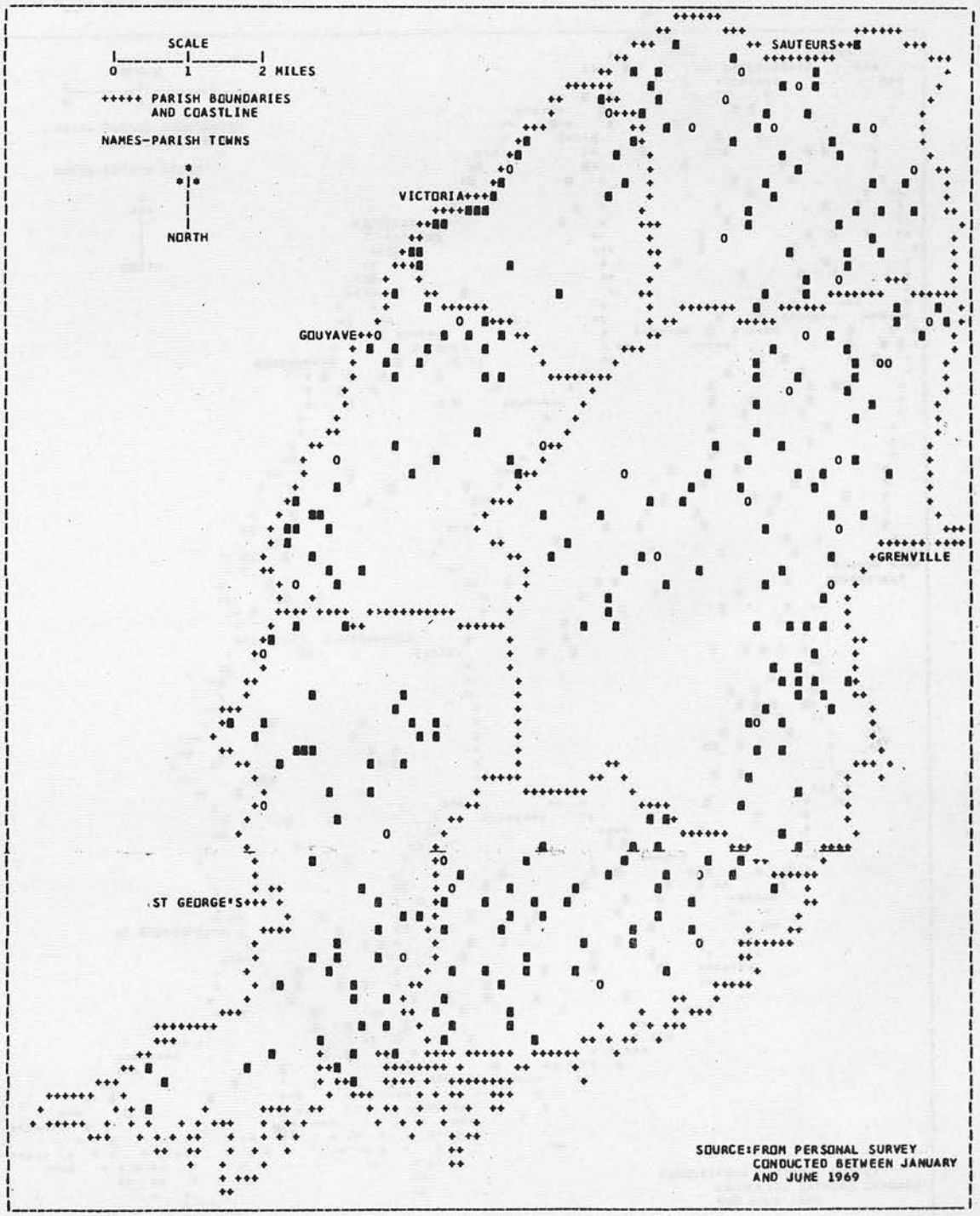
amongst the plots of vegetables; and 4) the ready market for fresh milk and beef in St George's Town. A further association between livestock and farm production is that between the draught donkey and the production of export crops, particularly cocoa and nutmegs. On fragmented farms where these crops are produced, the donkey can be useful in transporting the bulky produce from the parcel of land and if need be in carrying the farmer. It is particularly the older and more established farmer who has this animal, as he is more likely to have his land in cocoa and nutmegs, rather than in bananas which is the younger man's crop (supra, p. 247).

Farming practices

Differences between the parishes in the use of fertilizers and the practice of mulching crops vary and so provide some indication of differing levels of farming (Table 11.5). The majority, 53 per cent, of the farmers use both artificial and organic fertilizers, with 16 per cent using only chemical fertilizer and 17 per cent using only manure. Fertilizers are least used in St John's and St Patrick's parishes which have been previously identified for low levels of living (supra, p. 90) and poor farming practices (Computer Map 16).

Mulching is practised on 80 per cent of the farms and is carried out more frequently in the three western parishes of St George's, St John's and St Mark's which are wetter, than in the eastern three (Computer Map 17). It is therefore thought (though this has not been substantiated by conversation with the farmers) that organic matter placed around the roots of plants serves to protect the soil from water erosion, rather than to conserve moisture during the dry season.

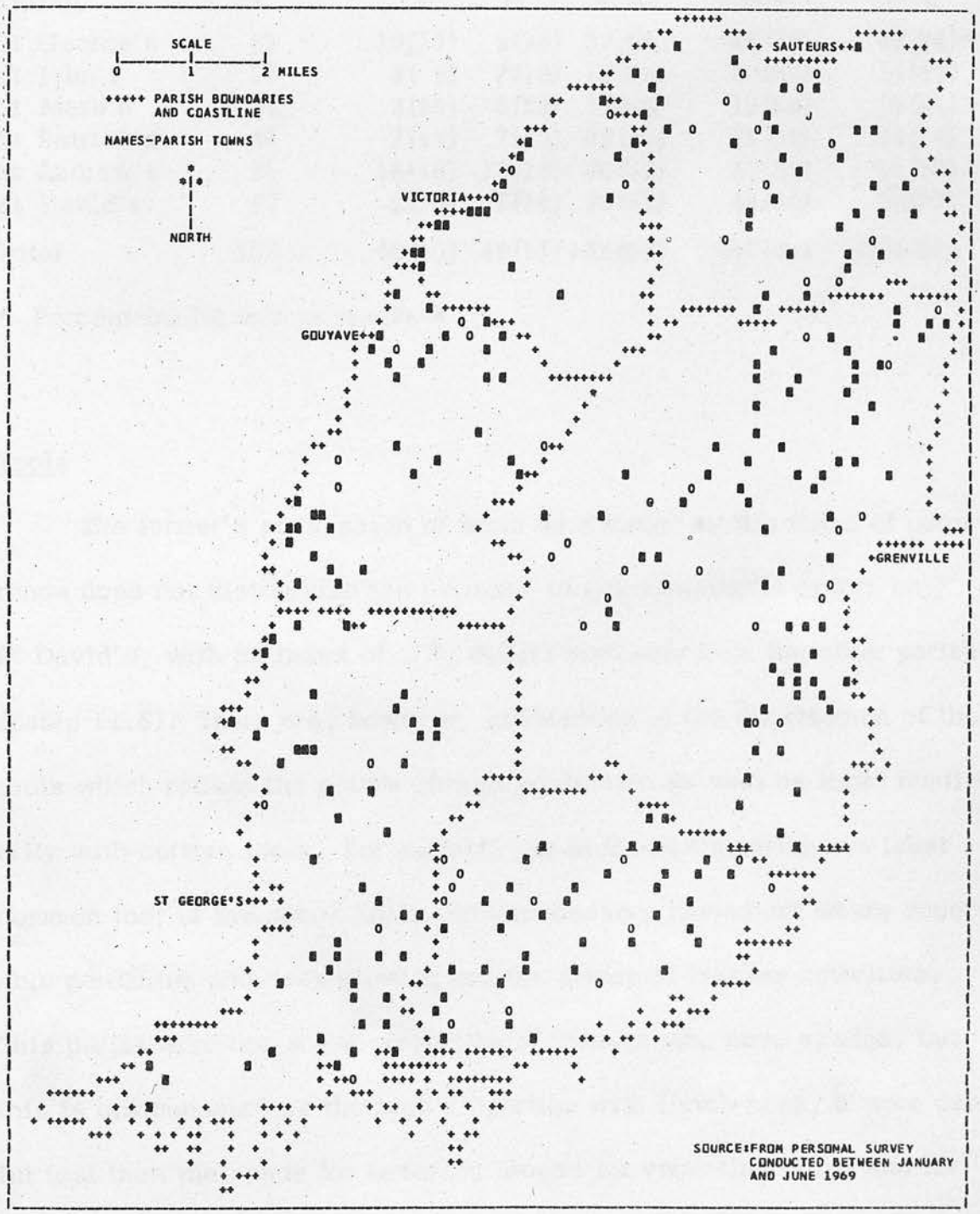
AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
FARMERS WHO FERTILIZE THEIR CROPS



LEGEND
0 DO NOT FERTILZE
■ DO FERTILIZE

COMPUTER MAP 16

AGRICULTURAL SURVEY OF SMALL FARMERS IN GRENADA 1969
FARMERS WHO MULCH THEIR CROPS



LEGEND
0 DO NOT MULCH
■ DO MULCH

COMPUTER MAP 17

TABLE 11.5 USE OF FERTILIZER AND PRACTICE OF MULCHING

Parish	Number of farms	Type of fertilizer: Chemical only	Manure only	Chemical and manure	Total using fertilizer	Total using mulch
St George's	52	10(19)	9(18)	27(52)	46(88)	48(92)*
St John's	38	3(8)	7(18)	19(50)	30(79)	31(82)
St Mark's	21	3(14)	6(29)	10(48)	19(90)	17(81)
St Patrick's	46	7(15)	7(15)	22(48)	36(78)	34(74)
St Andrew's	86	14(16)	13(15)	46(53)	73(86)	66(77)
St David's	49	9(18)	7(14)	30(61)	46(94)	38(77)
Total	292	46(16)	49(17)	154(53)	250(86)	234(80)

* Percentage figures in brackets

Tools

The farmer's possession of tools as denoted by the index of occurrence does not distinguish the parishes in any meaningful order; only St David's, with an index of .79, differs markedly from the other parishes (Table 11.6). There are, however, differences in the distribution of the tools which reflect the nature of crop production as well as local familiarity with certain tools. For example, in St George's parish the least common tool is the cocoa knife, an unnecessary implement where vegetable gardening and cane growing are the principal farming activities. This parish also has a low proportion of farmers who have spades, but this is compensated by the high proportion with Dutch hoes, a more useful tool than the spade for terracing slopes for vegetable crops and for digging holes in preparation for planting ground provisions. The

TABLE 11.6 DISTRIBUTION OF TOOLS AND THEIR INDEX OF OCCURRENCE

Parish	Number of farms	Type of tool: Dutch hoe	Weeding hoe	Cutlass	Spade	Fork	Sack or basket	Cocoa knife	Index of occurrence
St George's	52	39	27	52	31	48	45	16	.71
St John's	38	21	6	34	31	34	31	26	.68
St Mark's	21	9	1	20	20	19	18	16	.70
St Patrick's	46	19	16	45	32	42	44	36	.72
St Andrew's	86	20	32	83	71	80	79	51	.69
St David's	49	32	35	48	37	43	46	31	.79
Total	292	140	117	282	232	266	263	176	.72
Percentage of total	100	48	40	97	80	91	90	60	

prevalence of the Dutch hoe rather than the weeding hoe in this parish and also in St John's, St Mark's and St Patrick's, has been mentioned before, and is not fully understood, especially since the weeding hoe is more common in St Andrew's and St David's. Both types of hoe are, however, the least frequently found tools and occur on less than half the farms; the most common tools are the cutlass, basket and spade.

Levels of farming

A major aim of this thesis is to study the effects of a different social-economic landscape upon the levels of farming practised. To this end a hierarchy of development of this landscape between the different parishes was established in Chapter 3. In order to classify the level of farming practice on individual farms, it was expedient to

consider categories of small farms, for to have compared the farming practice on a non-commercial farm with that on a miniature estate would have necessitated a flexible set of criteria, or alternatively made the evaluation of levels of farming wholly subjective. Levels of farming were therefore determined for each farm within the framework of four categories of small farming.

In Table 11.7 the levels of farming of all the farms in each parish are shown. Of the sampled farms, 53 per cent are classified as average, with 26 per cent 'above' average and 21 per cent 'below' average. St George's is the outstanding parish as it not only has the lowest percentage of farms classified as 'below' average, 14 per cent, but also the highest 'above' average, 40 per cent. St David's is the only other parish where there are more farms classified as 'above' than 'below' average. St Patrick's is notable in having the lowest proportion of farmers 'above' average, 17 per cent, and the highest in the 'average' category, 61 per cent. This method of examining levels of farming does

TABLE 11.7 EVALUATION OF LEVELS OF FARMING

		Farming levels (percentages)		
Parish	No.of farms	Below average	Average	Above average
St George's	52	14(7)	46(24)	40(21)*
St John's	38	26(10)	50(19)	24(9)
St Mark's	21	19(4)	53(11)	28(6)
St Patrick's	46	22(10)	61(28)	17(8)
St Andrew's	86	25(32)	55(47)	20(17)
St David's	49	18(9)	49(24)	33(16)
Total	292	21(62)	53(153)	26(77)

* Number of farms in brackets

not supply a single indicator of farming levels, but this is obtained by weighting the three classes of farm levels, with one point for farms 'below' average, two points for those which are 'average' and three points for those 'above' average. These weights are summed for each parish and the average level of farming determined on each farm for each parish. The results, which are given in Table 11.8, show a definite order between the parishes. St George's has the highest level, 2.27 points, followed by St David's with 2.15 and St Mark's with 2.10. The other three parishes have similar levels around 1.95. A statistically significant difference exists between St George's and St John's, St Patrick's and St Andrew's; St David's is also distinctly higher than St Patrick's and St Andrew's (Table 11.9). A comparison between the level of farming and the rank order, or hierarchy, of the socio-economic landscape (Table 11.9) shows a limited degree of positive correlation, as Spearman's Rank Correlation Coefficient, $\rho = .43$. (The mid-rank position was used in this calculation for both the hierarchy, and

TABLE 11.8 RESULT OF WEIGHTING LEVELS OF FARMING

whereby 1 point - for below average, 2 points - average, 3 points - above average

Parish	Average level of each farm	Rank	Sampling error
St George's	2.27	1	.09
St John's	1.97	4	.12
St Mark's	2.10	3	.11
St Patrick's	1.95	4	.08
St Andrew's	1.94	4	.07
St David's	2.15	2	.10
Total	2.05		.09

TABLE 11.9 SPEARMAN'S RANK CORRELATION BETWEEN LEVELS OF FARMING AND SOCIAL-ECONOMIC HIERARCHY AND LEVELS OF LIVING

	Mid-rank positions		
Parish	Social-economic hierarchy	Levels of farming	Levels of living
St George's	1	1	2
St John's	5.5	5	5
St Mark's	5.5	3	2
St Patrick's	3.5	5	6
St Andrew's	2	5	4
St David's	3.5	2	2
	1		2

1. Spearman's Mid-Rank Correlation between the level of farming and the social-economic hierarchy has a coefficient $\rho = .43$. This suggests some relationship of a positive nature, but one which is not statistically significant.

2. Spearman's Mid-Rank Correlation between the level of farming and the level of living has a coefficient $\rho = .89$, a result which has a 95 per cent level of statistical significance.

for levels of farming whereby St John's, St Patrick's and St Andrew's parishes are regarded as having the same level.) This indicates that there is some relationship with the social-economic landscape, but that it is not statistically significant. The nature of the influence of the social-economic landscape has been mentioned in discussion of the various categories of small farmers, where it was considered to motivate the farmer to greater achievements than his educational and occupational background would indicate. This was especially the case in St George's, where farmers are not outstanding for their educational attainments, but are, by virtue of their contact with a society which is economically advanced, given a greater stimulus for economic gain

than those with similar social or educational characteristics in less-developed parishes.

A comparison between the rankings for levels of farming and the social-economic landscape (Table 11.9) shows that St Mark's and St Andrew's have large discrepancies, of two-and-a-half and three rank positions respectively. The rank for level of farming in St Mark's is higher than that for the social-economic landscape, a difference which is due to the fact that the average estate worker had limited opportunities in which to work or purchase one acre of land and therefore qualify for this survey. This is indicated by the small proportion of non-commercial farmers, who are amongst the poorest farmers in the sample. Those, who are farmers in this parish, are its more prosperous and ambitious members, who have been able to purchase fragments of sub-divided estates which were too large and expensive for the average estate worker to purchase. This fact explains why miniature estates are the major category of farm in this parish. Thus the sample is not representative of the total population. The position of St Andrew's parish is something of an enigma since it is second in development to St George's in terms of its social-economic landscape, yet it has the lowest general level of farming practice. This fact strongly suggests that small farmers in this parish are neither influenced by this landscape nor representative of the general social structure of the parish. In contrast, St David's parish has a level of farming higher than the ranking of its social-economic landscape, a result which is considered to be due to its proximity to St George's parish, and in particular to St George's Town whose sphere of influence penetrates

eastwards rather than northwards into St John's as a result of the absence of any parish town in St David's. The population consequently seek employment and social services in St George's, a view confirmed by the number of St David's farmers who are civil servants and employees in service industries and work in St George's Town. The sample of small farmers who cultivate between 1 acre and 15 acres of land is not a representative cross-section of rural population in a parish, otherwise it is reasonable to assume that a higher degree of correlation between the social-economic landscape and level of farming would have been found.

Although the social-economic landscape does, to a limited extent, explain the levels of farming practice, it has not succeeded in giving a wholly satisfactory explanation. There are therefore other factors influencing the levels of farming practice, and a comparison between levels of farming and the social and economic character of the small farmers, as represented by their level of living (Table 5.12), shows a high degree of correlation at the parochial level (Spearman's mid-rank method of correlation, $\rho = .89$), a value which is statistically significant (Table 11.9). Thus, the farmers' personal attributes and achievements as denoted by their level of living appear to be more indicative of the general level of farming than the level of development of the cultural environment in which they farm. This conclusion prompted further analysis of the farmer and his farming system in the hope that a deeper appreciation of small farming might be achieved. It is this analysis which is discussed in the following chapter.

CHAPTER 12

FACTORS AFFECTING SMALL FARMING

Since levels of farming are not satisfactorily explained by the level of development of the social-economic landscape, an examination is made of the farmer's own background and achievements to indicate some of the other factors influencing the nature of his farming. In the chapters which dealt with the four categories of farmers, mention was made of certain variables which affected the farming system, but they were not subjected to any rigorous statistical analysis. Some of these variables are undoubtedly more important than others, although any judgment on their relative importance was often intuitive and hence subjective in its approach. In some cases this judgment was made on a small sample and therefore had only limited validity. In this chapter most of the significant variables influencing small farming are examined by means of the multivariate statistical technique of factor analysis. The results of this analysis indicate factors affecting small farming and show the interrelationship between certain social and economic variables.

From the previous chapters it is evident that a small farm is 'a complex system which needs to be simplified to allow the generation of manageable models capable of at least a limited explanation of production patterns'.[1] This is possible through factor analysis, a

1. Momsen, op. cit., p.480.

technique which is 'a means by which the regularity and order in phenomena can be discerned' and which 'makes explicit and more precise the building of fact-linkage going on continuously in the human mind'.[2] Factor analysis is a multi-dimensional statistical treatment where each variable represents a dimension. Its function is to reduce the number of variables to those which are the focus of attention and by so doing permit 'parsimony of description',[3] whilst retaining all the essential information of the original sets of variables. This analysis when performed on the 292 farms will suggest more objectively and explicitly the relationships which exist between selected variables. The analysis does not take account of the geographical description of the variables and assumes a homogeneous landscape to exist. With respect to small farms on a small island it is reasonable to assume that no strong geographic distribution of variables is present.

It is not appropriate in this thesis to explain or elaborate upon the system of factor analysis as this subject is adequately dealt with elsewhere.[4] The explanation given here is for the purpose of appreciating this analysis on farm data.

The variables which are considered for this analysis are obtained from the questionnaire. Those selected include aspects of labour

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2. R.J. Rummel, 'Understanding factor analysis', Journal of Conflict Resolution, Vol. 11, No. 4, p.462.

3. J.D. Henshall, 'Models of Agricultural Activity', in Models in Geography, ed. R.J. Chorley and P. Haggett, London, 1967, p. 441.

4. Rummel, op. cit.
H.H. Hanman, Modern Factor Analysis, Chicago, 1960.
D.N. Lawley and A.E. Maxwell, Factor Analysis as a Statistical Method, London, 1963.
L.J. King, Statistical Analysis in Geography, Englewood Cliffs, N.J., 1969, Chapter 7.

input, farm size, farm management, livestock, and social and economic attributes of the farmer's background. In all there are 37 variables which are numbered and listed in Table 12.1. Intercorrelations are assumed to exist between these variables and factor analysis attempts to identify the common characteristics which account for these inter-correlations. It is further assumed that in the matrix of interrelated variables there are some common factors (the number of which is less than the number of variables), and it is these which are identified by factor analysis.

The initial part of this analysis is concerned with the interrelations which exist among the 37 variables. Although the relationship between any two variables can occur by chance, it is assumed that the variables are interrelated. The matrix of correlation coefficients, Table 12.2, shows that the general level of correlations is low, as only 2 of the 666 values in the matrix have an absolute value greater than 0.5. These exist between such variables as, proportion of total income obtained from the sale of agricultural produce and occupation, and the first principal cash crop and the second. That most variables have a low coefficient, is also the finding of similar studies in the West Indies, namely Henshall's study of peasant agriculture in Barbados and that of Maharaj of small cane farmers in Trinidad.[5] As Henshall concluded, these low coefficients suggest the diversity present in peasant agriculture.[6]

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5. J.D. Henshall, 'The demographic factor in the structure of agriculture in Barbados', in Transactions and Papers of the Institute of British Geographers, Publication No. 38, 1966, p.188. D. Maharaj, 'Cane farming in the Trinidad sugar industry', unpub. Ph.D. thesis, University of Edinburgh, 1969, p.238.

TABLE 12.1 LIST OF VARIABLES

1 Proportion of total income derived from sale of agricultural produce.
2 Number of hours per week involved.
3 Contact with extension instructor.
4 Number of acres owned.
5 Number of acres rented.
6 Number of acres share-cropped.
7 Number of acres held in usufruct.
8 Number of fowls on farm.
9 Number of dairy cattle.
10 Number of beef cattle.
11 Number of milch goats.
12 Number of meat goats.
13 Number of pigs.
14 Number of sheep
15 Number of draught donkeys.
16 Number of manure donkeys.
17 Use of fertilizer.
18 Distance of farm from paved road.
19 Sex of farmer.
20 Age of farmer.
21 Marital status of farmer.
22 Number of children under 5 years of age in household.
23 Number of children between 5 and 15 years in household.
24 Number of other members of the household.
25 Religious denomination.
26 Educational standard of achievement.
27 Racial classification of farmer.
28 Farmer's attitude to agriculture.
29 Principal cash crop.
30 Second cash crop.
31 Third cash crop.
32 Farmer's recommendations on how local authorities could assist him to improve his farming.
33 Farmer's occupation.
34) Types of illness farmer has suffered from in the year prior to
35) questioning.
36 Farmer's attitude to questioning.
37 Number of days off work due to illness in the year prior to questioning.

The computer program used for factor analysis was BMDX72, devised by the Health Services Computing Facility, University of California, Los Angeles. It was run on the IBM 360/50 computer at the Edinburgh Regional Computing Centre.

TABLE 12.2 CORRELATION MATRIX OF SELECTED VARIABLES

CORRELATION MATRIX

	1	2	3	4	5	6	7	8	9	10
1	1.00000									
2	0.38649	1.00000								
3	0.22133	0.25293	1.00000							
4	0.29206	0.26194	0.26679	1.00000						
5	0.01686	0.23863	0.00519	-0.13931	1.00000					
6	0.10025	0.14806	0.01290	-0.13109	0.01414	1.00000				
7	-0.03544	0.04305	0.07108	-0.04867	-0.04056	-0.04383	1.00000			
8	-0.00290	0.04736	0.20658	0.10372	-0.04135	-0.01082	0.00679	1.00000		
9	0.01640	0.18236	-0.00933	0.01510	0.05456	0.31109	-0.04178	0.13982	1.00000	
10	0.03250	0.11318	0.04702	0.06033	-0.02746	0.16129	-0.00818	0.08311	0.46264	1.00000
11	0.08326	-0.01952	0.09011	0.17112	-0.01893	-0.02070	0.02133	0.02824	-0.04749	-0.03174
12	-0.03749	-0.07007	0.00520	0.09768	-0.03764	0.03098	0.02715	0.19812	0.28241	0.21443
13	0.11464	0.03278	0.07400	0.14221	-0.05426	-0.03757	0.09027	0.26064	0.07809	0.01840
14	-0.03893	-0.02282	0.02674	-0.01888	-0.04008	0.04124	0.08350	0.06104	0.00508	0.11805
15	0.09013	0.13799	0.04048	0.08945	0.09262	0.01397	-0.00489	0.04984	0.04435	-0.04065
16	0.00718	0.06049	0.18848	0.05202	-0.01633	-0.03670	0.22083	0.05883	0.02568	-0.03252
17	0.09350	0.22062	0.15119	0.11794	0.10108	0.05862	0.00558	0.06173	0.12559	0.02210
18	0.04929	-0.00360	0.04742	-0.04117	-0.01397	-0.04840	-0.03235	0.05796	0.02617	-0.02835
19	0.09109	-0.28688	-0.14964	0.00056	-0.06231	-0.10610	0.01395	-0.08271	-0.17843	-0.10578
20	0.31982	-0.01293	0.06378	0.19738	-0.12606	-0.03768	-0.12090	-0.07127	-0.03759	-0.00728
21	0.15722	-0.09590	0.00613	0.04438	-0.05418	0.04582	-0.02538	0.05292	0.06324	0.06792
22	-0.15113	-0.02401	-0.04516	-0.12193	0.02748	0.05605	0.00506	-0.02880	0.18494	0.07946
23	-0.10044	0.07482	0.02013	-0.00811	0.13610	0.09668	0.05248	0.08449	0.08083	0.05053
24	0.00362	0.02235	0.04682	0.06723	0.07870	-0.01200	0.02868	0.04309	0.10057	0.11976
25	0.05428	0.09936	0.14820	0.09399	0.10631	0.08302	-0.00285	-0.01531	0.07405	-0.04811
26	-0.12667	-0.01791	0.16441	0.23010	-0.08502	-0.05512	-0.00494	0.15967	-0.04147	-0.05564
27	-0.02055	-0.04443	0.08001	0.11757	0.09712	-0.13272	0.01664	0.01523	-0.11627	-0.11573
28	0.16443	0.15188	0.26549	0.19799	-0.01740	0.00036	0.02184	0.14097	-0.02017	0.06252
29	-0.13545	-0.02656	-0.17287	-0.20886	-0.00827	0.28095	-0.01350	0.08634	0.22960	0.22346
30	-0.24977	-0.16747	-0.19192	-0.25999	-0.02150	0.22459	-0.05114	0.03354	0.15788	0.21841
31	-0.20944	-0.15565	-0.19954	-0.23827	-0.03366	0.08286	-0.10265	-0.08717	0.03947	0.06256
32	-0.01783	-0.02341	0.00505	-0.02938	0.05889	-0.10070	0.01457	0.00798	-0.13405	-0.19120
33	0.65632	0.34291	0.17887	0.33962	-0.02229	0.03735	-0.08810	-0.05057	-0.03346	-0.00785
34	0.08500	0.12080	0.05589	0.20643	-0.10151	0.06274	0.04266	0.13387	0.06650	0.05959
35	0.02298	0.19858	0.07215	0.07202	0.01036	0.09610	0.01012	0.04755	0.06609	0.02589
36	0.09339	0.12909	0.14349	0.16431	-0.06660	-0.01319	0.01746	-0.01234	-0.03496	-0.08854
37	0.15332	-0.28082	-0.13523	-0.04718	-0.06361	-0.04229	-0.04306	-0.06144	-0.07978	-0.01554

	11	12	13	14	15	16	17	18	19	20
11	1.00000									
12	0.37463	1.00000								
13	0.26142	0.26044	1.00000							
14	0.02946	0.07084	0.18042	1.00000						
15	-0.00781	-0.02180	0.04468	-0.03706	1.00000					
16	0.05552	-0.01455	0.01344	-0.03527	0.07699	1.00000				
17	0.01673	-0.02734	0.19835	0.09305	0.10118	0.03914	1.00000			
18	-0.00609	0.03138	-0.01014	-0.03208	0.03689	0.09584	0.10097	1.00000		
19	0.00732	0.03910	0.02922	-0.05475	-0.08282	-0.08176	-0.11775	0.00956	1.00000	
20	-0.01554	-0.05292	0.01380	-0.03711	0.03408	0.07999	0.03500	0.06797	0.07397	1.00000
21	0.01453	0.15305	-0.04186	0.00651	-0.01073	0.03020	-0.01486	0.02854	0.06111	0.30607
22	-0.00865	0.15617	0.03594	-0.01549	-0.04343	-0.08011	0.00686	0.02242	-0.05917	-0.24829
23	0.05786	0.08465	0.15545	0.04714	0.03732	0.01573	0.05628	0.10795	-0.05769	-0.17534
24	0.14069	0.09572	0.15743	-0.01422	0.07813	0.08943	0.04392	-0.02158	0.05224	0.06680
25	0.09799	0.04052	-0.01703	0.09936	0.02465	-0.04459	0.13594	-0.00335	-0.01727	0.01836
26	-0.00271	-0.05144	-0.07335	-0.01927	-0.05316	0.02469	0.00007	-0.15691	-0.04690	-0.04548
27	0.08014	0.03259	0.04915	-0.01845	-0.02034	0.02246	0.06712	0.04648	0.03483	0.10552
28	-0.08145	-0.04023	0.02997	0.01715	0.03754	0.01390	0.08683	0.09145	0.04930	0.11050
29	-0.08084	0.11637	-0.07421	0.09227	0.00237	-0.08858	-0.06659	-0.08895	-0.02429	0.00673
30	-0.06183	0.09515	-0.03165	0.05002	-0.02211	-0.09078	-0.15593	-0.07204	-0.02221	-0.02890
31	-0.06736	0.03219	-0.05154	0.00921	-0.08331	-0.03050	-0.10682	0.00582	0.00798	0.03618
32	0.00541	-0.13057	0.02892	-0.07170	-0.10071	-0.03810	0.07979	-0.23622	-0.03084	0.07204
33	0.05601	-0.08777	-0.01479	0.00418	0.06381	0.04236	0.00955	0.01123	0.16000	0.29843
34	-0.03151	0.09029	0.03293	0.07085	0.06710	0.04564	-0.00968	0.03909	-0.01696	0.01153
35	-0.01180	-0.02767	-0.11748	0.01303	-0.05775	0.07796	0.10402	0.01771	-0.20002	0.02436
36	-0.00629	0.00879	-0.01087	0.04507	-0.03464	0.04730	0.06663	-0.02525	-0.02278	0.07272
37	-0.02673	0.03253	-0.02681	-0.00486	-0.01973	-0.03359	-0.15065	0.06460	0.24074	0.23457

	21	22	23	24	25	26	27	28	29	30
21	1.00000									
22	-0.09713	1.00000								
23	-0.04734	0.31472	1.00000							
24	0.02239	0.01304	0.13797	1.00000						
25	0.04837	-0.00734	-0.04911	0.09083	1.00000					
26	-0.14562	-0.05976	-0.05546	-0.06722	0.06685	1.00000				
27	0.02697	-0.08284	-0.00664	0.06835	0.16824	0.09086	1.00000			
28	0.05022	-0.04393	0.06989	0.04707	0.12468	0.20717	0.11092	1.00000		
29	0.09238	0.03999	-0.09856	-0.01463	-0.06567	-0.04965	-0.11045	-0.03804	1.00000	
30	-0.00890	0.12814	-0.02229	0.01926	-0.05020	-0.08200	-0.14370	-0.13759	0.54299	1.00000
31	0.09498	0.13240	0.02838	-0.02923	-0.13821	-0.10999	-0.12830	-0.08979	0.20053	0.40646
32	-0.02224	-0.03124	-0.02740	0.04201	0.00090	0.10155	-0.05902	0.04837	0.01657	0.12954
33	0.12502	-0.15273	-0.17071	-0.05214	0.12369	0.11678	0.05782	0.18929	-0.01983	-0.16824
34	-0.01423	-0.04018	0.02195	-0.04828	-0.01308	0.11528	0.06679	0.12318	0.06357	-0.10814
35	-0.02358	0.10402	-0.00042	-0.01670	-0.01845	0.08227	0.02264	-0.01331	0.12017	0.03519
36	0.06657	0.01274	-0.03083	-0.04000	0.17915	0.18585	0.17356	0.33291	-0.07148	-0.11968
37	0.29422	-0.01070	-0.07469	-0.06318	-0.03853	-0.08458	-0.04732	0.17885	-0.01856	0.02455

	31	32	33	34	35	36	37
31	1.00000						
32	0.04202	1.00000					
33	-0.12587	0.00206	1.00000				
34	-0.01882	-0.08682	0.07413	1.00000			
35	0.09819	0.10835	0.01629	0.18459	1.00000		
36	-0.06159	0.05206	0.16241	0.07202	0.02854	1.00000	
37	0.07760	-0.05627	0.19281	0.00050	-0.17236	0.06925	1.00000

The second stage of this analysis concerns factors which are derived from the correlation matrix and are based upon linear combinations of the original variables. Factors therefore identify clusters of variables in n-dimensional space. The first factor is determined by the degree of intercorrelation of the variables, with each factor in turn accounting for as much of the original variation among the individual farms as possible.[7] Interpretation of the factors is dependent upon the degree of relationship that exists between the variables as given by the factor loadings. Factors are usually identified by the variable which has the highest loading.

From the 37 variables considered, 10 factors were generated which accounted for 50 per cent of the total variation. However, only 9 per cent of this variation is accounted by the first factor, and subsequent factors have diminishing percentages. Thus, any one factor only explains the pattern of a small amount of information in the original matrix. That these percentages of variation are low is a reflection of the size of the data matrix, the low coefficients of correlation between the variables, regional variations in the nature of farming and the diverse character of the farmers' background and farming system. It does not invalidate the results of factor analysis which are dependent upon the choice of the original variables. As these variables are regarded as important ones influencing the nature of small farming, it is expected that they comprise the most significant factors. In order to identify the factors in the most meaningful way, it is necessary to

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6. Henshall, op. cit., p.188.

7. Momsen, op. cit., p.482.

consider the limitations of the input data (variables with both a nominal and ordinal system of coding were used and although it was realized they were not particularly suited for factor analysis were included to see their effect in the result) in conjunction with previous knowledge of small farming in Grenada. Thus, in examining the more important variables associated with a given factor, consideration is not always given to the relative weight of the loading of the variables in arriving at an acceptable explanation. This explains the inclusion of some variables with low loadings.

Interpretation of the factors

Factor 1

Primary variables showing the highest correlation with the factors

	Positive loadings		Negative loadings
Acreage of land owned	.634	Second cash crop	-.583
Agricultural Income Proportion	.629	Third cash crop	-.470
		Principal cash crop	-.400
Occupation	.609		
Extension instructor	.534		
Hours worked per week	.524		
Attitude to agriculture	.437		
Attitude to questioning	.366		
Age	.302		

The first factor is the most important as it accounts for 9 per cent of the total variance. It is regarded as the farm size factor since the acreage of land owned is the variable with the highest absolute loading. On an island where ownership of land is the dominating form of tenure, it is the one variable which is the best single indicator of farm income, thus, it is not surprising that the most closely linked variable is the

proportion of income obtained from the sale of agricultural produce. This association of variables shows that the larger the amount of land owned on a farm, the greater the likelihood that its farmer relies on agriculture for his economic livelihood. Also fairly closely linked with these variables is that of the farmer's occupation, an association which reveals the obvious fact that farmers with larger farms are usually principally occupied working their land. Other variables which increase with farm size are contact with extension instructors and the number of hours worked each week on the land. Other variables which have notable positive loadings are those of attitude to agriculture and attitude to questioning. The relationship here indicates, for example, that farmers with a keen attitude were willing to be questioned about their farm and that such farms also had more land to farm. The variable of age has a loading worthy of mention, as it indicates that the older farmers are those who are likely to own more land and to be independent farmers.

This set of variables shows an inverse relationship to the three groups of cash crops, which as their negative loadings indicate, are closely related. The inverse relationship exists because of the nominal system of coding the cash crops, whereby the three export crops had low numbers, 0, 1, 2, and fruits and vegetables higher numbers, 3 to 12. Consequently, the larger farms usually sell export crops and the smaller farms, fruits and vegetables. This fact is clearly substantiated in that miniature estates almost exclusively produced export crops. The grouping of the three cash crops indicates that farmers who sell one export crop, commonly have another export crop as a second cash

crop, and similarly for farmers who sell food crops.

This factor has associated variables which reveal basic characteristics of the structure and nature of small farming and reinforce the findings made in the study of the four categories of farms.

Factor 2

Dairy cattle	.666	Sex	-.407
Beef cattle	.538	Days off work	-.344
Hours worked per week	.440		
Acreage of share-cropped land	.427		

Since dairy and beef cattle are the two variables with the highest loading, this factor is considered to be the first livestock factor. It explains 7 per cent of the total variance. The relationship between these two variables is self-evident, however, their association with the number of hours worked each week on the land and the acreage of share-cropped land raises some interesting points, namely that cattle are mainly kept on farms where the farmer is actively engaged in agriculture and that these farms are usually found in the cane belt, the only region where share-cropping is found. Thus, by implication this factor is geographic in nature.

Both variables with negative loadings provide further evidence about farms which maintain cattle. As binary coding was used to identify the sex of the farmer, i.e. male 0 and female 1, the inverse relationship between sex and cattle shows that female farmers have fewer cattle and also work less hours than the male. The variable, days off work, indicates that women are more likely to be ill and unfit than men (a not unexpected fact since many are widows and older than the male farmers) and therefore rarely keep cattle.

This factor has revealed some aspects of livestock maintenance which were not readily evident from previous analysis, and has therefore contributed to a further appreciation of small farming.

Factor 3

Marital status	.533	Children 5-15 years	-.272
Days off work	.526		
Age	.519		
Occupation	.440		

This factor is associated with such variables as marital status, age and occupation of the farmer and is considered as the personal factor. It accounts for 6 per cent of the total variance. The linkage of its variables shows that the older the farmer, the more likely he is to be married or widowed and to have employment other than that of an estate worker or unskilled labourer. As farmers whose principal occupation is working their own land are coded with the highest number, the relationship indicates that not until farmers are in the upper age categories do they obtain economic independence; a point which confirms the evidence that commercial farmers and operators of miniature estates are older than non- and semi-commercial farmers.

The negative loading for this factor is low and as the variable appears to have no important association with the other variables it is ignored.

Factor 4

Meat goats	.581	Hours worked per week	-.427
Pigs	.546		
Milch goats	.501		

This factor accounts for 6 per cent of the total variance, and can be considered as a second livestock factor as the variables with the

highest positive loadings are meat goats, milch goats and pigs. There is an inverse relationship between the number of these animals and the number of hours worked on the land, suggesting that it is the less active farmers who keep pigs and goats, animals which require less attention than cattle.

Factor 5

Education	.630	Acreage of rented land	-.399
Attitude to questioning	.365	Agricultural income proportion	-.331
Fowls	.310		
Attitude to agriculture	.301		

As the variable indicating the standard of educational attainment has the highest positive loading, this factor is regarded as the education factor. It accounts for 5 per cent of the total variance. Although the linkage between education and the other variables is weak, their relationship shows that more educated farmers tend to have a more receptive attitude to the questionnaire, to be more enthusiastic about agriculture and to keep more fowls (possibly an indication that they appreciated the value of protein in their diet).

Both acreage of rented land and proportion of income from the sale of agricultural produce are variables with negative loadings. Thus, the inverse relationship suggests that the more educated the farmer, the lower his acreage of rented land and the smaller his reliance on agriculture for his income. This corroborates the fact that the more educated classes, such as civil servants, businessmen and members of the professions, are usually non-commercial or semi-commercial farmers, and hence have only a partial interest in farming.

Factor 6

Distance from paved road	.541	Advice to improve farming	-.533

This factor explains 4 per cent of the total variance and, as the major loading is that of the distance of the farm from a paved road, it is considered to be the isolation factor. This distance is inversely related to the classification of the suggestions given by the farmers for the improvement of their agriculture, which included roads, water supply, farm loans and subsidy schemes. As roads were coded 1 and water supply 2, the inverse relationship shows that farmers recognized their isolation in proportion to their distance from a paved road. Thus, this factor illustrates an aspect of the social-economic landscape as influencing small farming.

Factor 7

Religious denomination	.479	Manure donkey	-.280
Attitude to questioning	.437		
Attitude to agriculture	.410		

Since this factor associated religious denomination with the farmer's attitude to questioning and to agriculture, it is considered to be the religious factor. As Roman Catholics were coded 0 and the various Protestant groups 1 to 9, the association of variables shows that Catholics are more likely to have a carefree or mediocre attitude to farming, while the Protestants are likely to be more enthusiastic in their attitude to farming and more open in answering the questions in the survey. This pattern of religious attitudes towards farming agrees with that noted in the analysis of the various categories of farms, where the greater the Protestant component, the keener the approach

to agriculture and the more developed and important the farm unit. Although this factor accounts for only 3 per cent of the total variance, it does suggest that religious beliefs do affect attitudes and achievements in farming.

Summary

Factor analysis has served to structure the more important variables of small farming into meaningful factors, and in so doing it has, at least in a few instances, provided a deeper understanding of the relationship between certain variables than that previously made, while at the same time it has supported some of the claims made in discussion of the four categories of small farmers. The identification of these factors shows that social ones, such as the personal factor, the education factor and the religious factor, are important influences in the farming system. This result reveals the relevance of the farmer's social background in determining his success on the land, a conclusion which was implicit in the previous chapters. An aspect of the social-economic landscape was identified in the isolation factor. The most important factor, however, is that of farm size, since it accounts for the highest proportion of the total variance. It would seem, therefore, that the amount of owned land on a farm is the major factor influencing the nature of small farming and implies that the larger the farm, the more developed is its agricultural practice. That size of holding is important, justifies the classification of categories of farms partly on the basis of size. The identification of this factor as the most significant corresponds to the finding of Maharaj who did

a similar analysis on sugar cane farmers in Trinidad.[8] The fact that he used a different set of variables and that from these the size factor emerged as the most important, strongly suggests that at least in part of the West Indies, the size of the farms is a fundamental criterion in any study of farming.

The results of factor analysis must be considered with certain reservations due to the low level of explanation and to the subjective element inherent in the procedure (initially in the selection of the variables and secondly in the description of the factors). The results do, however, comply with some of the impressions gained from the tabular data presented in earlier chapters. Thus, factor analysis has served to strengthen and further the investigation into the structure and nature of small farming.

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8. Maharaj, op. cit., p.240.

CHAPTER 13

SUMMARY OF CONCLUSIONS

The chapter provides a summary of the conclusions which emerge from this thesis. As such it evaluates both methodological and factual contributions, and considers some of the wider implications of the findings as they might influence future research and the development of small farming. Factors which emerge from this study may also be considered as those which can influence the nature and structure of farming in other parts of the world where systems of peasant agriculture prevail. As Finkel (1964) stated, the Leeward and Windward Islands 'represent in miniature the problems of many larger countries'.[1]

Methodological contributions

The study encountered certain methodological problems which were mainly associated with three aspects of the research, namely 1) the social-economic landscape, 2) the availability of data on small farming, and 3) the analysis of this data. The experience gained in resolving these problems provides insight into the difficulties which can be associated with research concerning underdeveloped areas. In

1. H.J. Finkel, 'Patterns of land tenure in the Leeward and Windward Islands, and their relevance to problems of agricultural development in the West Indies', Economic Geography, Vol.40, No.2, p.163.

addition this experience allows some conclusions to be drawn as to the effectiveness of the methodology.

When establishing a hierarchy of social and economic development for the parishes, the principal problems lay in determining the validity of the criteria being used, especially as to whether or not they were reliable and representative of the parish. The examples of radio licences and of birth and death rates (supra, p. 53) illustrate the error in accepting all parish statistics at face value. The lack of certain parish statistics and the tabulation of other data on a basis other than the parish meant either substitution of other sets of data for the appropriate area or translation of other data to the parish framework. In establishing a hierarchy between the parishes on the basis of the selected criteria, the procedure of summing the rankings with respect to each criterion was effective, since the results corresponded to field observations and local assessment. Besides providing the data for ranking, the matrices of criteria for the parishes (Tables 3.1 and 3.3) provides a useful quantitative description of the social and economic differences between the parishes. As these sets of criteria were successful in obtaining a hierarchy of development, they might be considered for use in other areas where analysis between regions is being made.

The main problem in the design of the questionnaire was to obtain a maximum degree of co-operation from the small farmer while at the same time causing a minimum of inconvenience and embarrassment. The fact that only two questionnaires were rejected for inconsistent answers, together with the genuine general interest taken in the survey

by both farmers and officials in the Department of Agriculture, suggests that the questionnaire was essentially sound in its content and organization. This response was undoubtedly aided by the emphasis the questionnaire placed on the social background of the farmers, as opposed to information which focused on the purely economic aspects of the farm, and which could be suspected of providing incriminating evidence of tax evasion. The format of the questionnaire with its lists of anticipated responses and compact layout proved successful, not only in the field where it was easily handled and quickly completed, but in the transferring of data from the questionnaire to 80 column punch cards.

The actual experience of conducting the interview at the housespot of the farmer was valuable in obtaining a subjective evaluation of the farmer's level of living and of his farming practice, as exhibited by his kitchen garden. By conducting the survey in this way, it was possible to become acquainted with the majority of the farming communities in the island, an experience which was most valuable in understanding regional differences in small farming. This experience was enhanced when some farmers showed their methods of cultivation or indicated specific farming problems on pieces of land other than the housespot. Such visits invariably provided further insight into the working methods of small farmers.

Problems encountered in analyzing the data led to another methodological contribution; that of classifying farms on the basis of the farmer's reliance upon agriculture for his livelihood and upon the amount of land he has under cultivation (Chap.7, pp.129-34). Four categories of farms emerge, viz. non-commercial, semi-commercial,

commercial and miniature estate, and these are considered in the main to represent progressive stages in small farming. Although the nomenclature is not original, the criteria used in this classification are. Since the examination of these types of farms reveals a logical sequence of characteristics, the method of classification is considered to have some merits, viz., it allows observation of the pattern of growth of small farms, identification of the attributes of the more successful farmers and indication of the time and events associated with reaching the different stages.

Consideration of these contributions can benefit planning and undertaking of further studies of small farming in other regions of the world where peasant agriculture is found.

Factual contributions

The principal contribution of this study is that it adds to the existing knowledge and understanding of small farming in Grenada. It is conceivable that there are broader implications and that this study may contribute to a greater appreciation of small farming elsewhere in the West Indies and the developing world.

The conclusions pertaining to the factual findings are considered under four topics: the physical and cultural environment; the characteristics of the structure of small farming; the nature of small farming; and, the implications of the results of factor analysis.

The physical and cultural environment

In analyzing the physical environment (Chap. 2) and the social-economic landscape (Chap. 3) the aim was to establish differences

between the island's six parishes which might account for variations in the structure and nature of farming in these parishes. In terms of their physical features St George's and St Patrick's parishes have the greatest regional difference in slope and rainfall. In contrast St John's and St Mark's parishes are the most homogeneous as they are characterized by steep slopes and less areal variation in rainfall, so that their agricultural potential is limited. These differences are sufficiently great to affect the nature of the principal cash crops, so that areas of crop specialization occur. In the wetter interior of the island bananas and nutmegs are the predominant crops, with cocoa becoming more important at lower elevations. Where soils are friable and fertile, vegetables can be cultivated on a commercial scale, otherwise the type of soil found on the island does not greatly affect the nature of the major crops.

Study of the social and economic landscape enabled the parishes to be ranked in order of their level of development. The results revealed marked differences between the parish which was most developed, St George's, and those which were least developed, St John's and St Mark's. It was initially hypothesized that differences in levels of farming between the six parishes would reflect differences in the social and economic landscape, and that by investigating factors of this landscape it might be possible to establish the nature of those factors which are important in developing small farming. Preliminary analysis of the social background of the farmers suggested, however, that the parish sample of farmers was not representative of its social-economic landscape, therefore it was unreasonable to suppose the

hypothesis would be valid in the context in which it was being tested. Subsequent study of the structure of small farming showed that levels of farming are less closely correlated to the social-economic landscape, than they are to the social and economic background of the farmer.

The characteristics of the structure of small farming

The structure of small farming is considered to consist of four components, viz. the non-commercial, semi-commercial, commercial and miniature estate categories of farms. Examination of these components permitted determination of the characteristics associated with the growth of the farm and of the personal attributes of individuals of likely to progress in agriculture. In the course of this examination identification was made of factors retarding this growth and therefore of factors affecting the general social and economic development of the island.

Of vital concern to the growth of the farm is the acquisition of land, which is difficult unless it is inherited (and then it is usually only a small fragment). For most rural folk saving is not easy, because wages relative to the cost of living and to the price of land are low, and the prevailing philosophy to life often echoes that of their slave ancestors, being one of 'live today for you do not know what tomorrow may bring'. Consequently the average estate worker can work a lifetime to own eventually only 1 or 2 acres. Farmers with larger holdings are those who have held or hold positions which pay a higher wage than that received by the average estate worker. Such farmers

are persons 1) who can hold positions of responsibility, such as estate overseers or managers, 2) who possess skills, namely carpenters, masons and tailors, and/or 3) who have had sufficient initiative and foresight to have sought employment abroad, mainly in Trinidad, Aruba and Curacao, where their wages were several times the Grenadian equivalent, enabling them to save more readily and purchase land upon their return. Consequently, people with these qualifications become increasingly evident in successive categories of farms.

Because of the difficulty of saving and acquiring land, about half the farmers have additional employment to that of working their own land, i.e. the non- and semi-commercial farmers, so that their interest, efforts and attention are divided to the general detriment of efficient farming. It is not until most farmers are in their fifties that they become independent farmers, a fact which means they spend the best part of their active working life in the employment of others. It is not only the difficulty of saving capital which retards the expansion of the farm holdings, but also problems in obtaining bank loans for farm development and of the unsuitability of cash tenancy to the prevailing system of farming. Both bank loans and more widespread practising of cash tenancy would enable farmers to become independent at a younger age, when they are likely to be more energetic and enthusiastic about agriculture. However, owing to their poverty, most small farmers lack the collateral necessary to obtain loans for farm development, while cash tenancy does not provide a workable alternative to ownership of land, because it lacks security of tenure, an essential prerequisite in the cultivation of tree crops.

Farm growth is therefore achieved through the purchase of an additional piece of land when the farmer has adequate savings to buy it. Since he can rarely acquire a piece of land contiguous to his initial holding, the farm is characterized by fragmentation, the degree of which increases with successive categories of farms. This fragmentation is considered to reduce farming efficiency since it reduces the intensity of cultivation and restricts the nature of land use as pieces of land are located further from the housespot.

There are other human considerations which are evident in the structure of farming. Notable amongst these are the farmer's educational attainment, and his religious and racial associations. In general the level of education is low, the mean standard reached being 4.3. Those farmers with the highest academic achievements are civil servants, businessmen and members of the professions, most of whom are non- or semi-commercial farmers and are unlikely to progress much further in farming. Amongst the remaining farmers, it was noted that farmers who had reached the third standard and above at primary school were those most likely to be overseers and managers on estates, to be skilled workers and to have worked abroad. They usually become the more successful commercial farmers or the operators of miniature estates. The significance of this level of education is that it has enabled farmers to be sufficiently familiar with the three Rs for them to understand agricultural publications and bulletins and to appreciate the basic principles of profit and loss. Farmers who had not reached the third standard are, or had been, manual workers on estates or unskilled labourers for most of their life, and usually

they occupied less than two acres of land. As such they hardly ever had contact with extension instructors, mainly because their holdings were deemed unimportant. Consequently they neither benefited from the instructor's knowledge nor the various subsidy schemes which are sponsored by the Department of Agriculture and administered through the extension service. It is these farmers who usually have the lowest level of farming practice.

Both religious and racial associations are considered to be indicative of varying degrees of motivation. It was shown (supra, p.95) that with respect to non-agricultural criteria there were differences in the material achievements of the various religious denominations, with the Protestants being more successful than the Roman Catholics. In analyzing the various categories of farms the proportion of Protestants increased with successive categories, an indication that religious beliefs do influence achievements in agriculture. The implications of race are similar, especially between the negroes and the coloureds, where historically the farmers were of lower status, with little expected of them in the way of social and economic achievements, while the latter were more privileged and motivated. The result is a colour-caste consciousness (supra, p. 97) which serves to retard the progress of the negro. Consequently negroes are usually those having experience at manual occupations in the non-commercial, semi-commercial and commercial categories. Coloureds, where they are found in the non- and semi-commercial groups, invariably hold positions in non-manual occupations. In the commercial category their proportion therefore declines from that of the previous categories, however, they have

above proportional representation as operators of miniature estates, since the status associated with this position is comparable to that of non-manual workers and is therefore deemed socially acceptable by the more ambitious coloureds. From this fact it can be assumed that a full-time farmer with 7 or more acres in cultivation (the critical amount for classification as a miniature estate) can earn an income comparable to that which he can earn in other ways. It is interesting to note that Lewis (1951) recommended that farms of between 8 and 10 acres be established for farm settlement programs in order that individuals who had the potential for being successful farmers be attracted to the land rather than being drawn to jobs in urban centres.[2] The same argument is therefore still applicable for Grenada and one worthy of consideration.

The nature of small farming

Another factual contribution of this study is that it reveals quantitatively the nature of land use and production on small farms. These topics are, however, adequately discussed and summarized in Chapter 11 and are therefore discussed only briefly here. By means of a comparison of the indices of occurrence for vegetable and tree crops on the various fragments, land use was shown to vary with fragment number (Tables 11.1 and 11.2). The kitchen garden is the dominant feature on F1 and contains a selection of root crops, salad vegetables, peas and beans which constitute an important part of the daily diet. A variety of fruit trees are present to supplement this supply of

2. Lewis, op.cit., p.73.

vegetables. Fragments with higher numbers are characterized by export crops, with cocoa being more important on pieces of land below an elevation of 800 feet, and nutmegs and bananas predominating above this height. Of secondary importance on some of these fragments is the provision ground which provides additional vegetables either for household needs or for sale in the local market.

The nature of farm production was determined by the main cash crops sold by the farmers and the results illustrated a heavy reliance on export crops (Table 11.3). Most farmers usually named two out of the three export crops, therefore their wellbeing is largely dependent upon foreign markets, the stability of which is uncertain (supra, p.14). Only in St George's parish are export crops not the major source of income, as here sugar cane and market gardening are more important. This difference in the nature of production reflects the presence of the last remaining sugar processing mill on the island and the island's principal urban centre, St George's Town. The remaining aspect of farm production is livestock, but it is relatively unimportant, as animals are kept primarily for the supply of domestic needs and not for sale. It is mainly in the sugar cane and market gardening areas that livestock are most commonly kept. The production of quality livestock is an aspect of small farming which needs expansion, because not only would it serve to diversify and thereby stabilize the character of the farms, it would also contribute towards a reduction in the amount of dairy produce and meat imported to the island.

Implications and recommendations from the results of factor analysis

In addition to providing a framework for appreciating the internal variation between small farms, factor analysis gave results which reinforced the argument that social factors are important in the structure of small farming. It is upon these results that certain recommendations for the development of small farming can be made and topics for future investigation outlined.

The main recommendation is that consideration be given to the factors which emerge from this study in the formulation of new schemes for the improvement of Grenada's agriculture. For example, the farm size factor (supra, p.342) draws attention to the difficulty the farmer has in acquiring land and the advanced age at which he becomes an independent farmer. It is therefore suggested that the government in Grenada facilitate the process by which 'suitable' candidates for small farming can become independent farmers when they are in their thirties rather than their fifties. Some of the qualifications and characteristics of the 'suitable' candidate are evident from the descriptions given of the people who become successful commercial farmers or operators of miniature estates. By providing encouragement, incentive schemes, expert agricultural advice and financial assistance (in the form of agricultural credit on easy terms) to worthy candidates, small farming could be characterized by a more active, progressive and aggressive element than it is at present. It could dispense with the need to go abroad or to continue in employment while working the farm. Such an element is necessary if small farming is to increase its

efficiency of land use and manpower, and consequently make a greater contribution to the island's economy. But such assistance by itself would by no means solve the problem posed by small farmers. Of vital concern is education, another of the factors which emerged in the analysis. The level of educational attainment has been shown in this study to affect the farmer's achievements, a finding which supports Balogh's claim for Jamaica that lack of education is the fundamental reason for that country's agricultural backwardness and stagnation.[3] Thus, it is reasonable to assume that an increase in the overall level of schooling will lead to improved farming methods and achievements. However, a higher educational attainment alone will not achieve the desired results; educational reform is also necessary because 'rural education had found itself handicapped by the failure of the school system as a whole to adapt to the environment'[4] and does not satisfy the existing economic needs and social conditions.[5] The primary school, therefore, should remove the existing prejudice against working the land and instil the idea that farming is an honourable occupation which can be profitable when modern methods of cultivation are applied. If it can achieve this end then the system of education will have opened the door to widespread social and economic development.

The results of factor analysis and the other findings of this study can be of assistance to the extension instructor in the field.

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3. T. Balogh, The Economics of Poverty, London, 1966, p.299.

4. E. de Vries, 'Existing social and economic patterns and trends', in de Vries, op.cit., p.63.

5. L.B. Pearson, chairman, Partners in Development, New York, 1969, p.200.

By realizing that educational attainment, religious affiliation, occupational skills, experience overseas, marital status and racial group are aspects of the farmer's background which influence his success in agriculture, the instructor will be enabled to understand and appreciate his farmers more fully. Knowledge of the four categories of farms will assist the instructor to identify individuals who have the potential to become successful farmers, and then to provide them with every encouragement to become independent farmers while they are still in their thirties and forties. A general familiarity with the findings of this study could enable the extension service to increase its effectiveness, and thereby reduce the extent of those traditional practices which are wasteful of space and energy.

While this investigation has highlighted some of the factors which influence the nature and structure of small farming, it has at the same time pointed the way for further research in this subject. While these findings relate to farming on Grenada, it would be interesting to investigate their application to other islands in the Caribbean, or even in other countries of the developing world. In addition, there is a need for further study into the ways in which religion and race affect achievements in agriculture, how traditional values and beliefs can be replaced by more modern and scientific ones, how education can best serve the development of agriculture and how development plans can most successfully integrate social and economic goals. Studies of these topics will lead to a greater understanding of 1) the social behaviour of the farmer, and 2) methods by which this behaviour can be modified. Once this understanding is achieved, then large-scale

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agricultural development schemes can be formulated and successfully implemented, for the

> ... expansion of agricultural production ... depends as much on the peasant [small farming] communities' capacity for change and reaction to new ideas, as it does on the use of new methods or the reclamation of new land.[6]

In the past the failure of well-laid development plans 'can be traced to the neglect of anticipating the small farmer's reactions which are now recognized as an indispensable factor in implementing agricultural policy'.[7] There is still considerable scope for further investigations into the problems of small farming, but it must be the farmer, as much as, if not more than, his farming system which should be the focus of attention.

Within these broad outlines for research, there is the need for specific study in Grenada of the ways and means by which small farm production can be modified and made more efficient. This study has shown that farmers are principally concerned with three export crops whose future markets are uncertain. Feasibility studies and market research are required to find other tree crops which are suitable both to the island's physical environment and the established system of farming. At the same time consideration should be given to the problems of transforming the prevailing character of small farming into one where food crop production and the raising of livestock are much

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6. R. Dumond and B. Rosier, The Hungry Future, London, 1969, p.46

7. I. Noel and G.I. Maracheau, 'A Strategy for Development of Small-scale Farming in the Commonwealth Caribbean with special reference to Grenada', in Proceedings of the Fifth West Indian Agricultural Economics Conference, U.W.I., St Augustine, 1970, p.164.

more evident (as recommended by Bethke and Persaud, supra p.19). This change will only be achieved with the co-operation and understanding of the small farmer. Grenada cannot afford another disaster of the magnitude of Hurricane Janet to provide the stimulus for change

The small farming studied in this thesis is characterized by a backwardness and inefficiency which is anachronistic in this age of technical and scientific development. The general character of agriculture has not radically changed during the century, and most of the comments and recommendations of the various West Indian Royal Commission Reports (supra, p.xv) are still applicable today. But the need for agricultural change is more pressing than ever, as population growth makes increasing demands on the land. Change, however, will only be achieved when agriculture is accorded the prestige it deserves as the mainstay of the island's economy, and when the small farmer is accorded worthy status within his society. It will be then that Grenada realizes her national motto, 'Clarior et Tenebris' (to brightness out of darkness).

APPENDIX II

GLOSSARY OF TERMS

Cash crops — Any crops which are sold

Cyclomatic number — A measure of connectivity μ where the higher the number the more complete the network.

$$\mu = a-n+p$$

Where a = number of arcs, n = number of nodes, p = number of subgraphs

Export crops — Those cash crops which are produced principally for the export market i.e. bananas, cocoa and nutmegs

Farm — Land which is occupied and worked as a unit by a person or group of persons. Where a farm is composed of parcels of land these are referred to as pieces or fragments

Food crops — Fruits and vegetables which are eaten

Ground provisions — Local name for root crops, which are predominantly tannias, yams, sweet potatoes and dasheen

Housespot — Local name for piece of land on which house is located

Index of occurrence — A measure of comparison between the actual occurrence of a number of criteria and the highest number possible

Kitchen garden — That part of the piece of land on which the house is situated where vegetables and food trees are cultivated

Maroon — A work party of friends, neighbours and relatives who assist a farmer with a specific task, such as harvesting the sugar cane, in return for food and drink, the cost of which is often equivalent to the cost of hiring labour for the job

Metayer system — A means of acquiring a piece of land as payment for services rendered. In Grenada associated with the establishment of land in cocoa where a labourer would plant and care for the cocoa for a given number of years after which time he was given a proportion (often one-tenth) of this land

Provision grounds — That area of a piece of a fragment which is some distance from the housespot where vegetable crops, mainly ground provisions, are cultivated

APPENDIX III

COMMON AND BOTANICAL NAMES OF CROPS*

Common name	Botanical name
Vegetable crops	
Roots and tubers	
Arrowroot	Mananta arundinacea
Cassava	Manihot esculenta
Dasheen	Colocasia esculenta
Eddo	Colocasia antiquorum
Sweet potato	Ipomoea batata
Tannia	Xanthosoma sagittifolium
Yams	Dioscorea spp.
Temperate roots	
Beetroot	Beta vulgaris
Carrot	Daucus carota
Onion	Allium cepa
Radish	Raphanus sativus
Green leaf	
Cabbage	Brassica oleracea
Celery	Opium graveolens
Lettuce	Lactuca sativa
Fruit and pod	
Corn	Zea mays
Cow pea	Vigna unguiculata
Cucumber	Cucumis sativus
French bean	Phaseolus vulgaris
Groundnut	Arachis hypoggaea

* Descriptions of these plants are given in the following works:

M.L.A. Bruggeman, Tropical Plants and their Cultivation, London, 1957.

D. Hargreaves and B. Hargreaves, Tropical Trees found in the Caribbean, South America, Central America, Mexico, Portland, Ore., 1965.

M.J. McIlroy, An Introduction to Tropical Cash Crops, Ibadan, 1963.

H.C. Sampson, Cultivated Crop Plants of the British Empire and the Anglo-Egyptian Sudan, London, 1936.

Jamaica Agricultural Society, The Farmer's Guide, Glasgow, 1954.

Common name	Botanical name
Fruit and pod (contd.)	
Melogene	Solanum melongena
Okra	Hisbiscus esculentus
Pepper	Capsicum annum, c. frutescens
Pigeon pea	Cajanus cajan
Pumpkin	Cucurbita pepo
Tomato	Lycopersicum esculentum
Other crops	
Chive	Allium schoenoprasum
Sugar cane	Saccharum officinarum
Thyme	Thymus vulgaris
Tree crops	
Avocado pear	Persea gratissima
Banana (including Bluggoes and Plantains	Musa spp.
Breadfruit	Artocarpus incisa
Cashew	Anacardium occidentale
Citrus	Citrus spp.
Cocoa	Theobroma cacao
Coconut	Cocos nucifera
Mango	Mangifera indica
Nutmeg	Myristica fragans
Sapodilla	Achras sapota
Soursop	Annona muricata

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